Devoted to
TEXTILE
CHEMISTRY
BLEACHING
DYEING
PRINTING
FINISHING

MARCH 30, 1942
VOLUME 31, No. 7

PUBLIC LIBRARY
APR 6 - 1942
DETROIT

AMERICAN
DYESTUFF REPORTER

OFFICIAL PUBLICATION
of the
PROCEEDINGS
AMERICAN ASSOCIATION
OF TEXTILE CHEMISTS
AND COLORISTS

Making every fiber–every ounce of dye–work harder today

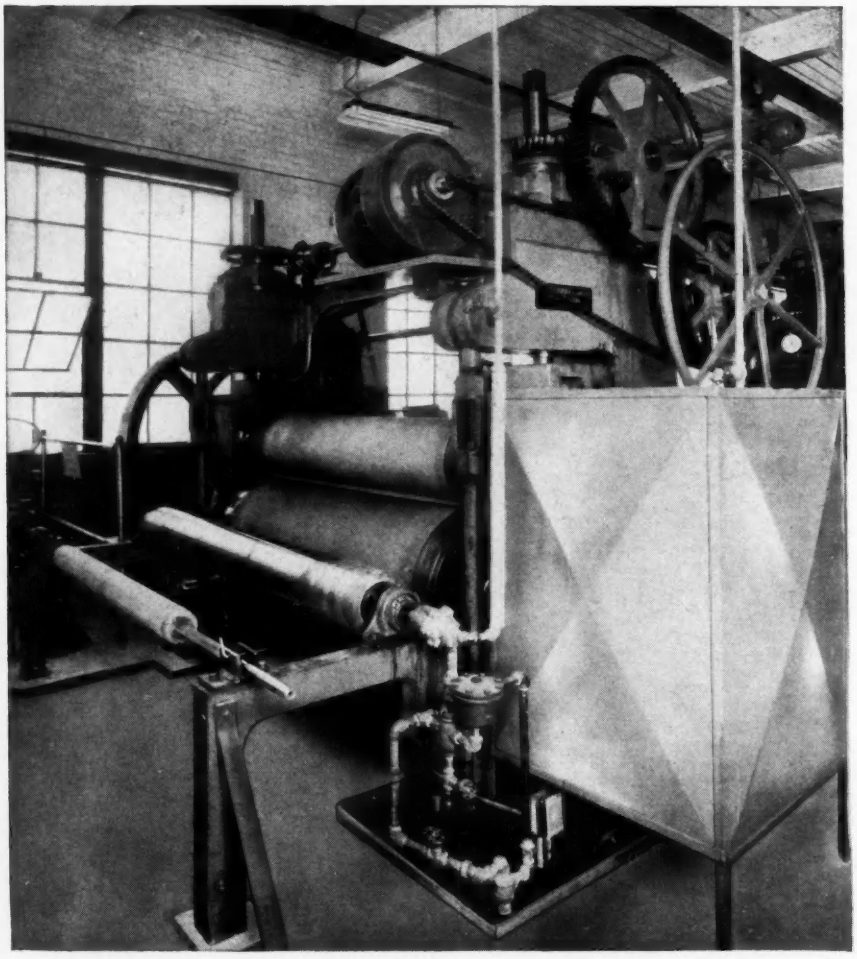
In this national emergency, conservation of available raw materials becomes doubly important. You face the problems of using every fiber to best advantage . . . of substituting where essential fibers are restricted . . . of developing new combinations and weaves.

This brings up another problem which calls for closest cooperation between you and the dyestuffs manufacturer. Every ounce of dye and chemical must be conserved and used to best advantage. Substitute fibers and new fabric constructions call for revisions in formulas on established constructions and shades.

Du Pont Dyestuffs technicians are fully alive to this conservation need. They are following fiber and fabric changes carefully. They want to work with you in coloring new constructions. Their practical knowledge and long experience enable them to help you revise old formulas and establish new dyeing and finishing formulas which will work best with available materials. Let them aid you today.

DU PONT DYESTUFFS

E. I. du Pont de Nemours & Company (Inc.)
Organic Chemicals Department, Dyestuffs Division
Wilmington, Delaware



Butterworth 2-Roll Embossing Calender for artificial leather. Shown at left is the 60-ton Machine for deep designs. 12-ton Machine is available for lighter grains. Driven by geared motor with chain directly connected to the bottom roll. Friction let-off at the entering end. Slip-belt winder at the delivery side. Top roll is steel engraved. Bottom roll is felt-paper. Micro-type housings. Pressure is applied by means of a hand-wheel through a worm and worm wheel. Pressure accentuates the springs on top of the arms by means of a cam.

Change designs in 15 minutes . . . Here is good news for embossers of artificial leather. Production formerly lost in changing designs is reduced to a minimum with the Butterworth 2-Roll Embossing Calender. The removal of one steel engraved roll and the installation of another is accomplished in 15 minutes. Arms and roller bearings are left on the journals. With this new Butterworth Calender, you get exactly the embossed effects you want. Powdering is reduced to a minimum because the drive is from the bottom roll —the larger roll. Let us give you full details.

Butterworth

H. W. BUTTERWORTH & SONS CO., PHILADELPHIA, PENNSYLVANIA : : Est. 1820. Plants at Philadelphia and Bethayres, Penna. : : Offices at Providence, Rhode Island, and Charlotte, North Carolina : : In Canada—W. J. Westaway Co., Hamilton, Ontario.

American Dyestuff Reporter, Vol. 31, No. 7, March 30, 1942. Published every other Monday. Copyright, 1942, by Howes Publishing Co., 440 4th Ave., New York, N. Y. Domestic subscription, $5.00; Canadian, $6.00; Foreign, $6.00. Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y., Post Office, under the act of March 3, 1879.

MEMO
If you cannot obtain certain vats . . . have you tried to replace them with A.A.P. Napthols, Salts and Bases?
AMERICAN ANILINE PRODUCTS, INC.
50 UNION SQUARE
NEW YORK, N.Y.
— DYESTUFFS —
BRANCHES
Providence, R.I.
55 Pine Street
Philadelphia, Pa.
210 N. 13th Street
Toronto, Can.
Dominion Anilines & Chemicals, Ltd.
265 Adelaide Street West
Chicago, Ill.
820 South Clinton Street
Charlotte, N.C.
301 East Seventh Street
Reg. U.S. Pat. Off.
PLANT: Lock Haven, Pa.

INDUSTRY ANSWERS THE CALL!

A WAR MESSAGE
to
ALL EMPLOYERS
★ From the United States Treasury Department ★
A PAY-ROLL SAVINGS PLAN
WHAT THE PAY-ROLL SAVINGS PLAN DOES
U. S. Defense BONDS ★ STAMPS
This space contributed to National Defense by
YOUR NAME HERE

32,145 Firms With Over 17,700,000 Employees Have Installed the . . .

PAY-ROLL SAVINGS PLAN

Have YOU Started the Pay-Roll Savings Plan in YOUR Company?

Like a strong, healthy wind, the Pay-Roll Savings Plan is sweeping America! Already more than 32,000 firms, large and small, have adopted the Plan, with a total of over seventeen million employees—and the number is swelling hourly.

But time is short!. . **More and more billions are needed, and needed fast, to help buy the guns, tanks, planes, and ships America's fighting forces *must* have. The best and quickest way to raise this money is by giving *every* American wage earner a chance to participate in the regular, systematic purchase of Defense Bonds. The Plan provides the one perfect means of sluicing a part of ALL America's income into the Defense Bond channel regularly every pay-day in an ever-rising flood.**

Do *your* part by installing the Pay-Roll Savings Plan *now*. For truly, in this war, this *people's* war, VICTORY BEGINS AT THE PAY WINDOW.

Plan Easy to Install

Like all efficient systems, the Pay-Roll Savings Plan is amazingly easy to install, whether your employees number three or ten thousand.

For full facts and samples of free literature, send the coupon below—today! Or write, Treasury Department, Section C, 709 Twelfth Street NW., Washington, D. C.

MAIL THIS COUPON NOW

Treasury Department, Section C
709–12th St., NW.
Washington, D. C.

We want to do our part. Please rush full information regarding the Pay-Roll Savings Plan.

NAME .....

POSITION .....

COMPANY NAME .....

ADDRESS .....

NUMBER OF EMPLOYEES .....

MAKE EVERY PAY-DAY . . . BOND DAY!

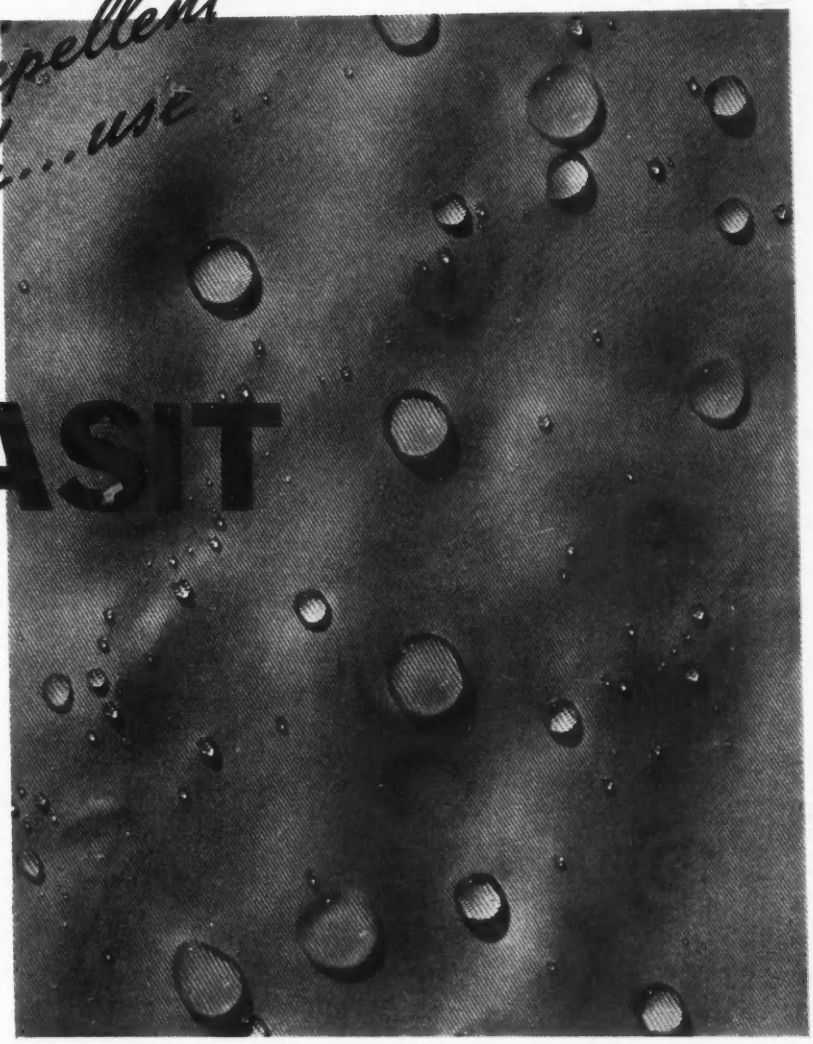
U. S. Defense BONDS ★ STAMPS

This space is a contribution to NATIONAL DEFENSE by American Dyestuff Reporter

GPO 16—20944-1 Form No. DSS-280

for a water repellent finish...use

RAMASIT



RAMASIT is a one-bath water repellent finish which, because of its low cost and ease of application, can be used on all grades of merchandise. It forms stable emulsions which are easily applied to cottons, rayons, silks and woolens on the quetch, padder, jig or beck. Ramasit imparts a superior water repellent finish. It leaves the fabric air porous and gives a soft and full handle. Information and samples will be sent at your request.

GENERAL DYESTUFF CORPORATION

435 HUDSON STREET, NEW YORK, N. Y.

Boston, Mass. Charlotte, N. C. Providence, R. I. Chicago, Ill. Philadelphia, Pa. San Francisco, Calif.

HERE'S WHY YOU'LL LIKE KELTEX

KELTEX was developed and is especially made to give you the following advantages as the thickening agent in print pastes for use on cotton or rayon, discharge work, padding operations, gum-water, and direct dye printing on rayons:

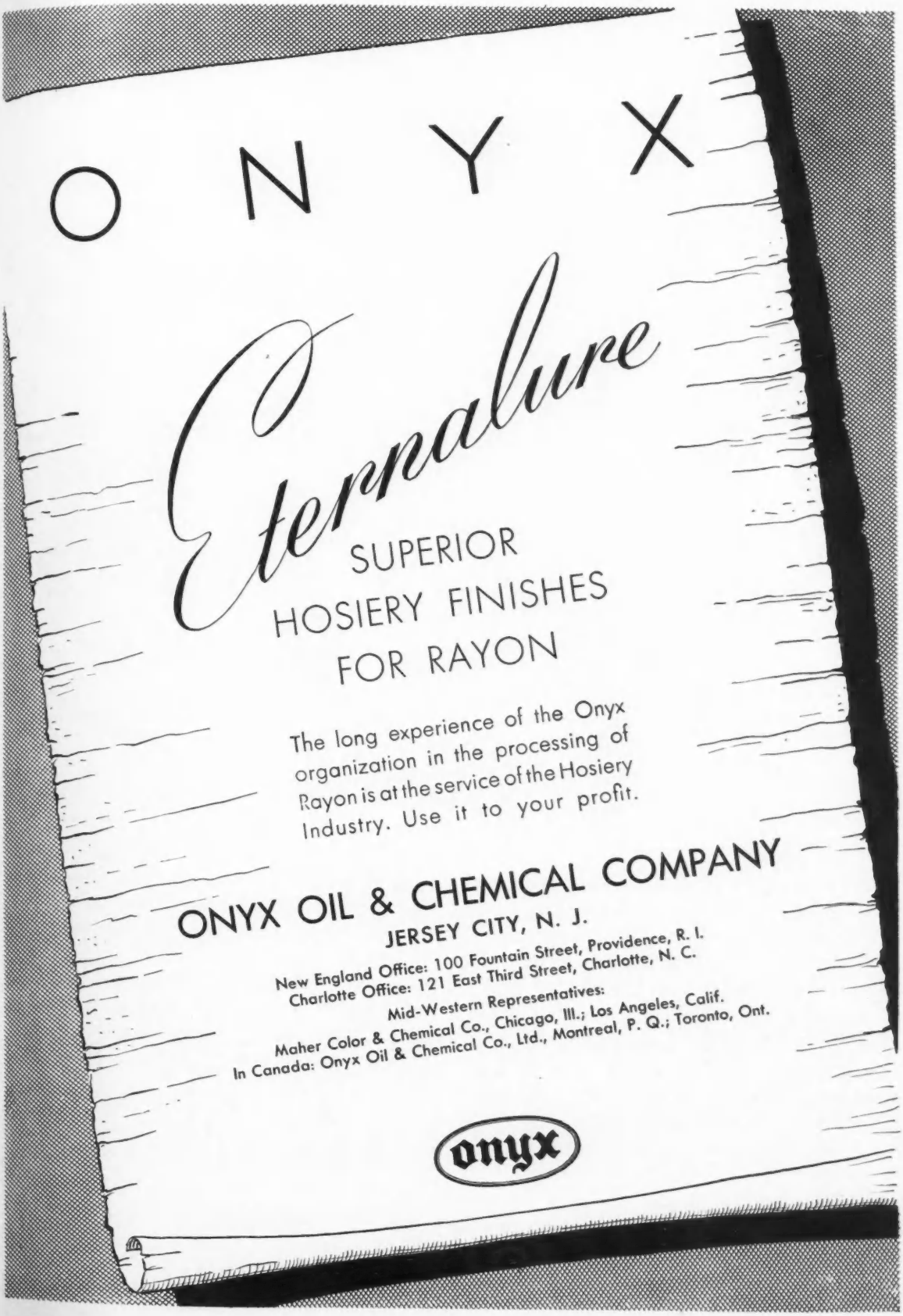
— excellent color yield
— good penetration
— easy removal with a light rinse
— no scratching or mark-off trouble in the washer
— low cost per unit of finished goods
— uniform quality.

Besides, KELTEX is easy to handle, simple to use. No boiling, filtering or other special handling required.

You'll like KELTEX!

KELCO COMPANY

75 East Wacker Drive, CHICAGO • 31 Nassau Street, NEW YORK • 530 West Sixth Street, LOS ANGELES


ONYX
Eternalure
SUPERIOR
HOSIERY FINISHES
FOR RAYON
The long experience of the Onyx organization in the processing of Rayon is at the service of the Hosiery Industry. Use it to your profit.
ONYX OIL & CHEMICAL COMPANY
JERSEY CITY, N. J.
New England Office: 100 Fountain Street, Providence, R. I.
Charlotte Office: 121 East Third Street, Charlotte, N. C.
Mid-Western Representatives:
Maher Color & Chemical Co., Chicago, Ill.; Los Angeles, Calif.
In Canada: Onyx Oil & Chemical Co., Ltd., Montreal, P. Q.; Toronto, Ont.
onyx

FOUR YEARS AGO an executive in Germany's largest textile research laboratory said, "After several years' work we have concluded that it is not feasible to affix inert pigments to textile fibres with resins. We don't believe it can be done practically. We are giving up the project."

One month before the war started, the same man, viewing samples of textile printing with Aridye* pigmented emulsions, said, "So the Aridye Corporation turned the trick!" We can only guess what he said later to his research staff, who had told him it couldn't be done.

This may well be considered one of the first American research victories of the war—one which made it possible for a textile finisher to use a printing method that was a definite "improvement in the art of textile printing" to quote from the Aridye Corporation's pigment printing patent.

And Now—PIGMENT-DYEING! *The full significance of this development commands the grave attention of every textile finisher in this emergency. Now—and we mean this minute—the textile finishers in this country, without lowering their standards, can obtain plain shades by this new pigment-dyeing method which uses relatively abundant materials. This will make available for military purposes much needed materials and production capacity.*

*Trade Mark Reg. U. S. Pat. Off.

ARIDYE CORPORATION • A SUBSIDIARY OF INTERCHEMICAL CORPORATION

"Dummkopf!
Warum konnten wir das nicht machen?"

(which freely translated means: "Why couldn't we make that?")

The textile industry is in a position to give this direct aid to our victory program. It is an advantage held in this country which we cannot afford to yield. For example, it has been estimated that a million yards of a particular taupe shade, pigment-dyed with Aridye colors, represented an approximate saving of 11,500 pounds of conventional dyes.

Comparative tests show that the industry's high standards of fastness are more than met by this method of pigment-dyeing (Aridye Corporation's U. S. Patent No. 2,248,696).

We believe it will find general use when superior lightfastness is required on special rayon fabrics, and when lightfastness plus scrubfastness is required on cotton fabrics, such as shirtings and work clothes.

Further comparative tests, covering Mildew Effectiveness, Resistance to Abrasion, Chlorine Retention, Air Porosity and Presence of Primary Irritating Substance, have been made by the United States Testing Company, Inc., under Tests Report Nos. 25568 dated December 31, 1941, 25568 dated January 20, 1942 and 26163 dated January 19, 1942. Full copies of any of these reports will be sent upon request.

Investigate these and the other advantages of dyeing by the Aridye pigment-dyeing method. We shall be glad to mail any finisher additional information including our standard form of license, under which a number of dyers are operating at present. Write to Aridye Corporation, a Subsidiary of Interchemical Corporation, Fair Lawn, New Jersey.

Aridye

TEXTILE COLORING MATERIALS

FAIR LAWN, NEW JERSEY • ROCK HILL, SOUTH CAROLINA • PROVIDENCE, R. I.

ONE OF A SERIES *of advertisements designed to keep you posted on Du Pont products and services.*

How Du Pont

DU PONT PRODUCTS FOR THE TEXTILE FIELD

ACIDS	RAYON
NYLON	DYESTUFFS
SOLVENTS	PEROXIDES
SIZING AGENTS	FIRE RETARDANTS
WETTING AGENTS	WATER REPELLENTS
FINISHING AGENTS	CLEANING AGENTS
SCOURING AGENTS	MAINTENANCE PAINTS

DU PONT

REG. U.S. PAT. OFF.

Listen to "Cavalcade of America" every Monday evening over coast-to-coast NBC Red Network.

Chemicals Add *Service* to Service Clothing

THE MOBILIZATION of America is reflected in the increasing demand for work and service clothing. Serviceability is the first consideration, and its importance directs attention to the use of these Du Pont Chemicals that help service garments give more service.

Vat Dyes stand up under sun, perspiration, oil, grease and laundering. They come through the famous "Oil Fields Test"—scrubbing with lye solution and drying with high pressure steam—strong and fresh.

"Zelan"* is Du Pont's long-chain nitrogen complex which imparts a durable, water-repellent, soft finish to cottons, rayons and other fabrics. It provides real protection against rain, non-oily stains and perspiration—even after many washings or dry cleanings.

"Aridex"* water repellent gives stain and spot resistance, and water repellency to woolens, worsteds and many other types of fabrics. It permits healthful free circulation of air because it does not coat or seal the cloth. Many laundries and dry cleaners now reprocess garments with this wax type repellent.

Fire Retardants are easily and quickly applied. They prevent spread of flame and afterglow. *Write for sample swatches.*

E. I. DU PONT DE NEMOURS & COMPANY (INC.)
WILMINGTON, DELAWARE

* Trade Mark
Reg. U. S. Pat. Off.

Indigosol Grey IBL

for Bluish tone Greys

INDIGOSOL Grey IBL produces clear, bluish-tone Greys of very good fastness for printing, dyeing and padding. It can be shaded with any of the Indigosol Yellows, Orange or Browns to obtain any of the shades of Grey desired.

One of its most important characteristics, in addition to its excellent penetration of heavy goods, is that it produces very level shades which are well covered *even in the lightest tones.*

INDIGOSOL Grey IBL is readily soluble and belongs to the class of Indigosols which develop easily.

Also

Pharmasol Brown GRNN

Yellower and brighter in shade

Better Wash Fastness

CARBIC COLOR AND CHEMICAL CO., INC.

451-453 Washington Street, New York City

BRANCHES:
PHILADELPHIA
PROVIDENCE HAMILTON, ONT.
CHARLOTTE, N. C.

IMPORTERS OF THE MANUFACTURES OF
DURAND & HUGUENIN S. A.
BASEL, SWITZERLAND

EXCLUSIVE DISTRIBUTORS OF
PHARMASOLS
PHARMOLS
PHARMACINES

Representative: Los Angeles (Hathaway Allied Products)

AMERICAN DYESTUFF REPORTER

A. P. HOWES
Publisher

LOUIS A. OLNEY
Directing Editor

NORMAN A. JOHNSON
Managing Editor

MYRON D. REESER
Advertising Editor

Official Publication of the Proceedings of the American Association of Textile Chemists and Colorists

MARCH 30, 1942

VOLUME 31 NUMBER 7

American Dyestuff Reporter, Vol. 31, No. 7, Mar. 30, 1942. Published every other Monday. Copyright, 1942, by Howes Publishing Co., 440 4th Ave., New York, N. Y. Domestic subscription, $5.00, Canadian, $6.00, Foreign, $6.00. Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y., Post Office, under the act of March 3, 1879.

Contents

Contents of previous issues can be found by consulting the Industrial Arts Index at your library

• Special Articles

Methods and Practice of Fiber Identification..... 149
J. M. Preston

Purifying Steam for Process Work..... 167
C. H. S. Tupholme

• Proceedings of the American Association of Textile Chemists and Colorists

Calendar of Coming Events..... P151

The Preparation and Applications of the New Synthetic Rubbers P152
Herman Boxser

Aralac P155
F. C. Atwood

Meeting, South Central Section..... P158

Meeting, North Carolina State College Student Chapter P158

Membership Applications P159

Meeting, Lowell Textile Institute Student Chapter..... P161

Unemployment Register P162

• Departments

Trade Notes—New Products 163

Open Forum 170

Copyright, 1942, Howes Publishing Co., Inc.

What the Best-Dressed Man Will Wear GLASS WOOL and SPUN RAYON

What a mixture to confound the old-time rule-of-thumb dyer! Now wrinkle-proof ties are being woven from spun-dyed glass wool faced with yarn-dyed rayon. Customers are completely pleased with the results!

Paralleling these ceaseless developments of new textile fibers and new processing techniques, National Technical Service works constantly to develop the formulas and colors you will need tomorrow as well as to provide for your present production needs.

Refer your technical problems to nearby National Technical Service.

NATIONAL ANILINE DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR STREET **NEW YORK, N. Y.**

BOSTON	150 Causeway St.	SAN FRANCISCO	517 Howard St.	NEW ORLEANS	Masonic Temple Bldg.
PROVIDENCE	15 Westminster St.	CHARLOTTE	201-203 W. First St.	CHATTANOOGA	James Bldg.
CHICAGO	357 W. Erie St.	GREENSBORO	Jefferson Standard Bldg.	PORTLAND, ORE.	730 West Burnside
PHILADELPHIA	200-204 S. Front St.	ATLANTA	140 Peachtree St.	TORONTO	137-145 Wellington St., W.

AMERICAN
DYESTUFF REPORTER

VOLUME 31 MARCH 30, 1942 NUMBER 7

Methods and Practice of FIBER IDENTIFICATION*

J. M. PRESTON, B.Sc., A.I.C.

THE "principles" of fiber analysis are the foundation upon which any reasonable practice must be based. Tabulating them in order of increasing subtlety they may be:

1. *Arrangement*—e.g., single fibers or fiber bundles.
2. *Size*—e.g., short staple, long staple or continuous filament; thick fibers or thin ones.
3. *Shape*—e.g., solid or hollow fibers; smooth, scaley or striated fibers; cylindrical, ribbon-like or convoluted fibers.
4. *Substance*—e.g., cellulose, hydrate cellulose, cellulose acetate, keratin, fibroin, casein, polyamide, poly-vinyl, alginate or silicate.
5. *Characteristic "Impurity" or Auxiliary Substance*—e.g., lignin, acetyl, carboxylic acid, protein, formaldehyde, or formaldehyde-urea compound, titanium dioxide, tin phosphate or zinc in fibers.
6. *Fine Structure*—e.g., arrangement and proportion of crystalline matter composing the fibers.

The arrangement, the size and the shape of the fibers can all be included in the term appearance. Appearance on the one hand and, on the other, chemical and physical properties are equally important as the basis of the identification of fibers. What one can see without and with a microscope is about equal in significance to that of all the rest put together; Wildman ("Identification of Animal Fibers") says: "Chemical tests are frequently put forward as the basis for fiber identification . . . For distinguishing vegetable fibers, chemical methods often serve only to distinguish broad groups, and microscopic examinations must be carried out before the identification of a specific fiber can be made. For distinguishing animal fibers the microscope is also absolutely necessary." Realizing that all the methods may be useful we should not expect to find a universal panacea in some new Universal Stain; though Neocarmine W or Shirlastain A are both very useful.

1. *Arrangement.* If fibers occur in adherent bundles which form long strands then they are vegetable bast or leaf fibers: the converse is not necessarily true, *e.g.*, "cottonized" flax.

2. *Size.* The thickness or fineness of fibers is often a useful guide, particularly considering also the staple length. Thus the thicker and longer ramie fibers can be distinguished from the finer and shorter flax fibers.

3. *Shape.* All vegetable fibers are hollow, *i.e.*, have lumens. The shape and size of the lumen in respect of the fiber cross section varies. It is small in mercerized cotton or flax, large in kapok or in immature and dead cotton hairs. The lumen is very irregular in size in jute. If a fiber has no lumen it is not a vegetable fiber, but there are other hollow fibers, *e.g.*, hollow artificial fibers, kempy wool, and many other animal fibers. This hollow part is termed a medulla in animal fibers. Sometimes it is continuous as in llama and sometimes interrupted as in angora. However, the rayons, silks and wools are generally solid fibers.

The relative smoothness of the surface is an important characteristic of fibers. Silk, cupra rayon, nylon, glass and mercerized cotton are smooth-looking fibers, while viscose, acetate, Vinyon, casein and tussah silk fibers are smooth only in the direction of their length, being striated. The striations are numerous in tussah silk or viscose and least in acetate, Vinyon and casein. They sometimes appear almost to be lumens when the fibers are only observed in the side view. A characteristic appearance is seen in cross sections of the artificial fibers; serrations indicate that they have shrunk after extrusion and that they were spun from dilute solutions. Scales on the surface are characteristic of animal fibers but scale effects have been produced on some of the artificial "wool" fibers which could be mistaken for the real thing on a careless inspection. On the other hand the scales may be missed in examining animal fibers which are strongly medulated, or naturally pigmented or deeply dyed, or chlorination and laundering may have destroyed the scales.

The convolutions of cotton are a characteristic feature and are evidence of the reversing spiral in the fine structure, but mercerized cotton is straight; deconvolution of cotton is taken as evidence of mercerization. Consequently although a convoluted fiber is almost certainly cotton a straight fiber can also be cotton.

4. *Substance.* By finding out the chemical nature of

*Paper presented to the Blackburn Textile Society, "Principles of Fiber Analysis." Reprinted from The Textile Manufacturer.

the fibrous substance fibers can be classified into groups, narrowing down the identification, though certain groups include a large number of possibilities, particularly so in the cellulose and keratin groups. The burning test is really a classification of chemical composition. Certain chemical reactions produce a similar grouping (the Molisch reaction for carbohydrates and Millon's reagent for proteins). Alternatively the various fibers could be grouped in other ways, *e.g.,* on the basis of staple length or density or X-ray diagrams. Unfortunately the burning test is no longer as reliable because there are more fiber mixtures; the micro appearance or microchemical reactions must be adopted for many of these. The burning test is very simple. It can show whether the bonds holding the fiber together can be broken by thermal agitation, *i.e.,* if the fiber substance will melt; also if the substance decomposes with heat it allows one to smell the products of combustion or decomposition which are often characteristic. With skill and experience the burning test will show even fine distinctions such as the differences mentioned later.

5. *Characteristic Impurity or Auxiliary Substance.* With vegetable fibers the degree of lignification is a useful guide, *e.g.,* cotton and ramie contain no lignin, raw flax very little whereas Indian kapok and jute are highly lignified. The trace (5-6%) of acetyl remaining in Celanese Fort can be detected and clearly differentiates it from highly-oriented regenerated cellulose rayons of other kinds. Similarly the protein inclusions in certain basified viscoses can be detected by Millon's reagent which distinguishes this sub-group from those viscoses basified by other amino compounds. The formaldehyde resin used in anti-creasing cellulose fibers can be identified by hydrolyzing the treated fibers with hot dilute sulfuric acid and detecting urea and formaldehyde in the hydrolysate.

Titanium dioxide is a frequently used delustering agent and when present it can be easily detected in the ash after incinerating the fibers. Similarly tin phosphate can be detected in the ash of weighted silk and a trace of zinc in the ash from most viscose fibers. In each case the detection of the mineral matter is evidence of the kind of fiber.

Swett's test for manila is another example even though the substance which gives the characteristic color to this fiber is not known. Of course, these tests may be vitiated by the removal of all or part of the substance tested for.

6. *Fine Structure.* The twist test depends on the direction of the spiral in the fine structure of vegetable fibers. It also depends on the fact that all crystalline cellulose structures swell more transversely than axially. Because of these two things the fiber has to untwist on wetting—on drying the fiber shrinks and twists up again. Thus by observing the effects of wetting and drying vegetable fibers the direction of twisting and untwisting shows whether the spiral is right or left handed. This serves to distinguish flax and ramie on the one hand from hemp, jute, manila and sisal on the other hand. This kind of test has the merit that it is unaffected by any treatment, dyeing, etc., which does not destroy the characteristic fine structure of the fibers. It would be obscured only by rendering the cellulose unswellable, *e.g.,* by acetylation or by anti-crease treatment.

Weltzien's swelling test for rayon gained some currency in the early thirties. The test depended on the complicated fine structures of the different rayons and the resultant length changes that occurred on swelling in water and caustic soda solution. This test might well repay further investigation now.

The Reversible Swelling Test has been found of value by the author, though it is little known outside the rayon industry. It is carried out by measuring the reversible swelling on wetting and redrying rayon yarns and filaments. It is a simple test to use and depends on the property of fibrous substances swelling transversely to the main chain direction of their crystalline structure. Consequently it is found that the greater the orientation the less is the reversible axial swelling. This is true of fibers as diverse as cellulose and nylon. Of course, different fiber substances swell to different extents so that the test can only be applied to comparisons within a homologous series of fibers in which nothing but the orientation varies. Here are a few typical values for cellulose fibers:

Highly oriented or "strong" viscoses	0.7-2%
Normal viscoses	4-7%
Special unstretched viscoses	10-15%
Isotropic	28.7%

When the orientation remains constant but the chemical nature is varied, the figures below are an indication of changes due to variation of moisture absorption.

	Cellulose acetate	
60%	acetic acid 1.5%	reversible swelling
54%	2.3%	
51%	2.5%	
	Deacetylated cell. acetate	
23%	8.1%	
3%	10.2%	

One might ask why bother with this test at all when strength and extensibility values will give the same indications? The answer is that the strength and extensibility values are also dependent on the degree of degradation while the reversible swelling is independent of it. The degree of orientation is an important property. It influences all sorts of other properties such as strength, extensibility and dye absorption and distinguishes otherwise closely related fibers. It can be evaluated in a number of other ways of which the X-rays and refractive index methods are best known. However, they are in some respects inferior and require more uncommon apparatus than the swelling method.

THE PRACTICE OF FIBER ANALYSIS

One character in a detective story tested fibers by tasting them, by which simple test he could say what the fibers were and also what part of the world they had come from! That is fiction but it is best not to require a great many complicated tests before applying one's own five senses. In other words handle the material, notice whether it is soft, whether it is extensible, whether it is strong and whether it

(Continued on page 169)

PROCEEDINGS OF THE

American Association of Textile Chemists and Colorists

MARCH 30, 1942

Officers of the Association

THOMAS R. SMITH, *President*
Wiscassett Mills, Albemarle, N. C.

ROLAND E. DERBY—CHARLES A. SEIBERT, *Vice-Presidents*

WILLIAM R. MOORHOUSE, *Treasurer*
National Aniline & Chemical Co., Boston, Mass.

HAROLD C. CHAPIN, *Secretary*
Lowell Textile Institute, Lowell, Mass.

LOUIS A. OLNEY
President Emeritus and Chairman of the Research Committee
Lowell Textile Institute, Lowell, Mass.

COUNCILORS

Representing Sections

FREDERIC A. PRISLEY; ALLISON R. FLETCHER (Rhode Island)
WILLIAM EBERSOLD; JOHN F. McCOY; WILLIAM A. STRINGFELLOW (Philadelphia)
J. ROBERT BONNAR; J. ERNEST MEILI; GEORGE A. MORAN; HAROLD W. STIEGLER (New York)
DEXTER R. KNEELAND; CLARENCE L. NUTTING (N. New England)
L. M. BOYD; ALBERT H. GRIMSHAW (Piedmont)
PERRIN N. COLLIER (South Eastern)
J. D. MOSHEIM (South Central)
ELMER F. SMITH (Midwest)

Past Presidents

ELVIN H. KILLHEFFER; P. J. WOOD; ROBERT E. ROSE:
WILLIAM H. CADY; ALBAN EAVENSON; CARL Z. DRAVES

Local Sections and Their Officers

Northern New England Section

John N. Dalton, Chairman, Pacific Mills, Worsted Division, Lawrence, Mass.
Edward S. Chapin, Secretary, W. C. Durfee Co., Inc., 114 Federal St., Boston, Mass.
Kenneth H. Barnard, Vice-Chairman; John H. Grady, Treasurer

Rhode Island Section

Ben Verity, Chairman, Carbic Color & Chemical Co., 6 Pine St., Providence, R. I.
Iver W. Fallstrom, Secretary, Arnold Hoffman & Co., 55 Canal St., Providence, R. I.
Howard V. King, Vice-Chairman; R. R. Farwell, Treasurer

New York Section

Harry R. Tisdale, Chairman, American Dyewood Co.,
22 East 40th St., New York, N. Y.
Norman A. Johnson, Secretary, American Dyestuff Reporter,
440 4th Ave., New York, N. Y.
P. J. Kennedy, Vice-Chairman; Edward H. Schmidt, Treasurer

Philadelphia Section

Arthur E. Jones, Chairman, Alco Oil & Chemical Corp., Philadelphia, Pa.
Boyce C. Bond, Secretary, 10 Meridith Road, Overbrook, Philadelphia, Pa.
James P. Conaway, Vice-Chairman; George E. Kohn, Treasurer

Piedmont Section

Thomas W. Church, Jr., Chairman, Highland Park Manufacturing Co., Charlotte, N. C.
Robert D. Sloan, Vice-Chairman; C. Norris Rabold, Treasurer
D. Stewart Quern, Secretary, Becco Sales Corp., 1021 W. Palmer St. Charlotte, N. C.

South Central Section

Jack Anderson, Chairman, Peerless Woolen Mills, Rossville, Ga.
Daniel A. Torrence, Jr., Secretary, 17 Crescent Park, Chattanooga, Tenn.
William J. Harrison, Vice-Chairman; Joe T. Bohannon, Treasurer

Midwest Section

Archie G. Alexander, Chairman, Phoenix Hosiery Co., 320 East Buffalo St., Milwaukee, Wis.
J. Gordon Stott, Secretary, Ciba Co., Inc., 325 West Huron St., Chicago, Ill.
James S. Morrison, Vice-Chairman; A. J. Feit, Treasurer

South-Eastern Section

Robert J. McCamy, Chairman, Pepperell Mfg. Co., Lindale, Ga.
Lee L. Baker, Secretary, Tesco Chemical Co., Atlanta, Ga.
C. Russell Gill, Vice-Chairman; T. A. Davis, Treasurer

Lowell Textile Institute Student Chapter

Ernest Peter James, Chairman; Stanley Szopa, Secretary

North Carolina State College Student Chapter

George W. Funderburk, Jr., Chairman; William R. Ivey, Jr., Secretary

Philadelphia Textile School Student Chapter

Joseph E. Dunson, Chairman; Ernest Stewart, Secretary

Members should notify the **Secretary** immediately of all address changes

CALENDAR of Coming Events

Meeting, Philadelphia Section, Hotel Philadelphian, 39th and Chestnut Sts., Philadelphia, Pa., April 10, 1942.

Meeting, Northern New England Section, April 10, 1942.

Meeting, New York Section, Swiss Chalet, Rochelle Park, N. J., April 24, 1942.

Meeting, Piedmont Section, Sir Walter Hotel, Raleigh, N. C., April 18, 1942.

Meeting, Mid-West Section, Schroeder Hotel, Milwaukee, Wis., April 18, 1942.

Research Committee and Council Meetings, North Carolina State College, Raleigh, N. C., April 18, 1942.

Meeting, Southeastern Section, Atlanat, Ga., June 6, 1942.

The Preparation and Applications of the New SYNTHETIC RUBBERS*

HERMAN BOXSER

Acadia Synthetic Products Division, Western Felt Works

WITH the advent of War in the Pacific, one of our vital raw materials, rubber, became seriously affected. As you well know, the government has initiated a rubber conservation program in our country. I do not know what poundage of unused crude rubber there is in existence in our country today. But we do know that the United States in the past consumed well over three fourths of the world's supply per annum. In the year 1941, this country utilized approximately 750,000 long tons, which in pounds, approximate one and three quarter billions.

It was natural for the average person to ask where the new synthetic rubbers entered the picture, and secondly —how helpful they would be in warding off any acute rubber shortage.

The newspapers, as you well know, have announced that our government plans to build plants for the production of synthetic rubber which will produce 400,000 tons per year. As of the present date, we are far below this productive capacity, and therefore far from self-sufficient in rubber. However, please do not overlook the fact that the synthetic rubbers which are being made at present, play an important role in certain phases of the manufacture of aircraft and mechanized units. In this respect, the synthetic rubbers are effective where natural rubber would fail.

Before proceeding further, we would like to clarify the meaning of the term "synthetic rubber." Basically this term should imply a synthetic material physically and chemically indistinguishable from natural rubber. The synthetic rubbers do not fulfill this basic definition.

When we discuss synthetic rubbers today we imply that we are considering a synthetic material possessing the approximate physical properties of natural rubber, while having a chemical structure which is definitely not synonymous to that of rubber. This is pointed out in the illustrations that follow.

Many suggestions have been offered for a general name for the synthetic rubbers, such as "synthetic rubberlike material" and "elastomers" but none of these have prevailed. The terms "synthetic rubber" appears to be here to stay.

Before proceeding to a discussion of the preparation of the synthetic rubbers marketed in the United States today, I would like to point out that the various synthetic rubbers result from either a polymerization or condensation reaction, from which atomic chains of very great length result. The reactions proceed in two general phases (1) the production of the monomer, and (2) the polymerization or, in certain cases, the condensation reaction, which usually involves the use of a catalyst, plus temperature and pressure.

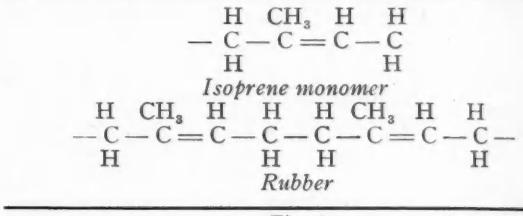
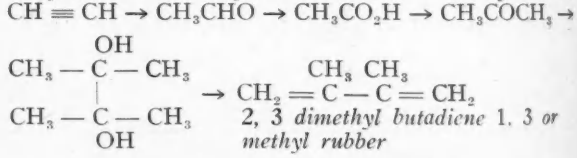


Fig. 1

In Figure 1 is shown what is assumed to be the structure of isoprene which is the monomer which polymerizes in nature to produce a long chain structure—rubber. You will note that rubber appears to be a chain of isoprene monomers hooked together. We would like to emphasize the presence of the methyl groups in the hydrocarbon, which structure early workers on synthesizing rubber, attempted to duplicate.

The Germans in World War I produced many tons of a synthetic rubber which they called methyl rubber. This was made from acetylene as shown in Figure 2. Here we



Preparation of Methyl Rubber

Fig. 2

note the conversation of acetylene to acetaldehyde, to acetic acid, to methyl acetone and finally to dimethyl butadiene, or methyl rubber. Please note the predominance of methyl groups when compared to the assumed natural rubber structure in Figure I. The production of methyl rubber was discontinued after World War I because of its high cost of production, as well as its inferiority to natural rubber in tensile strength and resistance to abrasion.

*Presented at meeting, Mid-West Section, January 31, 1942.

The synthetic rubber which has been produced in greatest volume during the past ten years is the chloroprene polymer, Neoprene. Neoprene is produced from coal, lime and water, which in turn produces acetylene. The reactions are shown in Figure 3.

$$3C + CaO \rightarrow CaC_2 + CO$$
$$CaC_2 + H_2O \rightarrow HC \equiv CH + CaO$$
acetylene
$$HC \equiv CH + HC \equiv CH \rightarrow HC \equiv C - CH = CH_2$$
monovinyl acetylene
$$HC \equiv C - CH = CH_2 + HCl \rightarrow$$
$$CH_2 - CCl - CH = CH_2$$
2 chloro butadiene 1, 3 or chloroprene

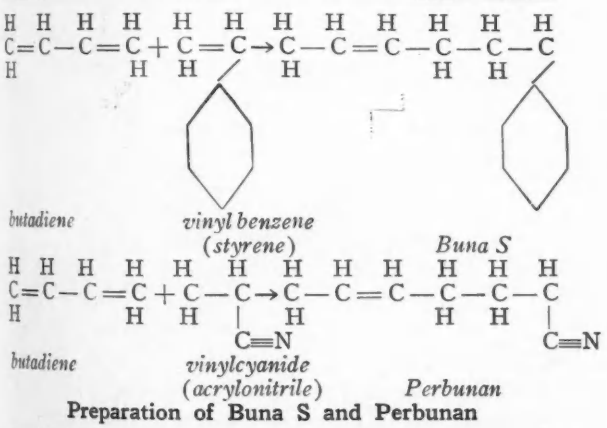
Preparation of Neoprene

Fig. 3

The chloroprene is polymerized in the presence of benzoyl peroxide to varying stages of polymerization, the latter being governed by the plasticity and the properties sought for in the final polymer.

There are many types of Neoprene which exhibit different properties.

A second group of synthetic rubbers are those termed butadiene polymers. These are the so-called Buna rubbers —Perbunan, Buna S, Hycar and Chemigum. Buna rubber was originally produced in Germany, and I might state that most of the German mechanized units in the present war are equipped with Buna S. The Perbunan type is now being produced in the United States. (See Fig. 4.)



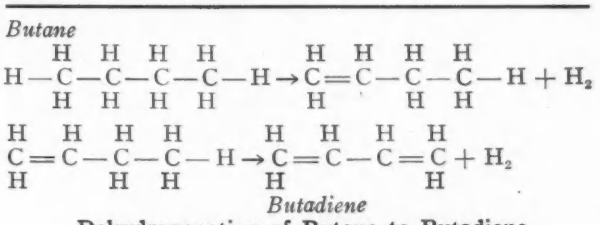
Preparation of Buna S and Perbunan

Fig. 4

Figure 5 shows one method for producing butadiene from butane by a dehydrogenation process.

By polymerizing butadiene with styrene, Buna S is produced. By polymerizing butadiene in the presence of acrylonitrile we produce Perbunan.

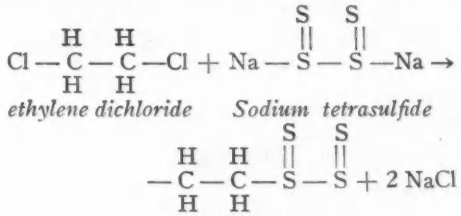
Perbunan is far more oil and solvent resistant than Buna S and therefore finds its greatest use in the United States for applications requiring these properties.



Dehydrogenation of Butane to Butadiene

Fig. 5

Thiokol which is produced from a condensation reaction between ethylene dichloride and sodium tetrasulfide is another synthetic rubber commercially available. The reaction depicting its preparation is shown in Figure 6.



Preparation of Thiokol A

Fig. 6

The type of Thiokol shown is a synthetic rubber whose general resistance to oils and solvents at room temperatures, especially chlorinated solvents and aromatic hydrocarbons is superior to the other types of synthetic rubber. However, it becomes plastic at higher temperatures, and at normal temperatures exhibits a high rate of cold flow. There is a new Thiokol polymer available today in which these drawbacks have been corrected to a marked degree.

In the foregoing we have reviewed briefly the preparation of the synthetic rubbers. Like natural rubber, these must be mixed with vulcanizing agents in order to produce a resilient, elastic material of good tensile strength. Secondly, they are capable of being compounded with a multitude of chemicals similarly to natural rubber.

I would like to show in what manner Neoprene and Perbunan are compounded in order to effect vulcanization. It might be well to point out that there are many compounding ingredients which may be added besides those shown to produce definite characteristics in the finished compound. These include clays, whiting, resinous materials and coal tar derivatives.

Figure 7 shows a basic Neoprene formulation of Neoprene Type GN and one of the butadiene polymer Perbunan.

The various carbon blacks do not reinforce or strengthen Neoprene to any extent comparable to their reinforcement of natural rubber or the butadiene types of synthetic rubber. In the compound shown, the magnesium oxide acts as an absorbent for any hydrogen chloride produced by

Compounding of Neoprene and Buna Rubber

Neoprene	*Pts. by Wt.*	*Perbunan*	*Pts. by Wt.*
Neoprene GN	100	Perbunan	100
Mag. oxide	4.0	Tricresyl phosphate	10
Med. process oil	10.0	Stearic acid	1.5
Thermatomic black .	100	Channel black	25
Stearic acid	1.0	Semi-reinforcing black	75
Phenyl beta naphthylamine ...	2.0	Zinc oxide	5
Zinc oxide	5.0	Benzothiazyl disulfide	1.25
		Phenyl beta naphthylamine ..	1.0
		Sulfur	1.5

Fig. 7

the vulcanization of the Neoprene as well as being a mild accelerator. Metallic oxides such as those of zinc or lead act as vulcanizing agents for Neoprene much as sulfur does for rubber. The phenyl beta naphthylamine is an anti-oxidant, while the stearic acid serves as a lubricant to prevent sticking to the mold. The oil acts as a softener for the Neoprene in the compound.

The Perbunan formulation shown is a typical basic compound. It is very similar to one that may be made with natural rubber. Carbon blacks exert a decided reinforcing effect upon the butadiene type synthetic rubbers. You will note that two types of carbon black have been used. Esters like tri-cresyl phosphate tend to soften Perbunan. Synonymously to its action in rubber, sulfur acts as a vulcanizing agent, while zinc oxide tends to activate the vulcanization. The whole reaction is accelerated by use of an organic accelerator, benzo thiazyl disulfide.

Effect of Diesel Fuel Oil on Neoprene and Perbunan*

	Neoprene	*Perbunan*
Tensile before test	1500 lbs.	2000 lbs.
Tensile after test	800 lbs. (46% dec.)	1300 lbs. (35% dec.)
Elongation before test.....	600%	600%
Elongation after test.....	200% (66% dec.)	450% (25% dec.)
Volume increase	27%	23.5%

* Test run at 200° F. for 12 hours.

Fig. 8

Figure 8 shows the results of a test in which two synthetic rubber compounds were exposed to the action of a diesel fuel oil at elevated temperatures. I can assure you that natural rubber would swell rapidly and disintegrate when exposed to these conditions. You will note that some deterioration has occurred to the synthetic rubbers, as shown by the increases in volume, and drop offs in tensile strength and elongation. However, if the exposed samples are examined following the test there is hardly any visual evidence of deterioration.

The synthetic rubbers in general possess greater oil, gasoline and solvent resistance than natural rubber. Some of them show greater heat and ageing resistance, as well as sunlight, oxygen and ozone resistance. Neoprene, incidentally is quite flameproof. Recently a Neoprene polymer has been produced which shows as good if not better resistance to freezing temperatures than rubber. Compounds made from this new polymer have exhibited good flexibility at —60 degrees F.

Inasmuch as most of you chemists are connected with the textile industry, you may ask what combinations can be made between a textile and some of these new synthetic rubbers.

I might point out that balloon fabrics coated with Neoprene or Thiokol are less permeable to gasses than natural rubber. Secondly they will withstand the deteriorating effects of strong sunlight to a greater degree. Cotton fabrics coated with synthetic rubber cements or with sheeted stock are used extensively as diaphragms in fuel pumps as well as in air activated valves. You will note in the films which follow how the new synthetics are being utilized for clothing for workmen who come in contact with chemicals which would rapidly deteriorate natural rubber.

I might emphasize that the synthetic rubbers when used in conjunction with mechanical pressed Felts have increased the scope of mechanical applications for felts, because of the added features of oil resistance gained by bonding the synthetic rubber to felt.

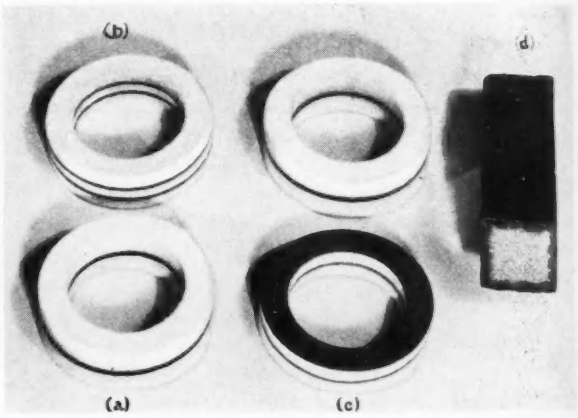


Fig. 9

The number of layers of felt and synthetic rubber will vary as Figure 9 shows, the structure depending upon the ultimate application of the finished product. The illustration depicts (a) synthetic rubber center and two outer layers of felt (b) three layers of felt and two layers of synthetic rubber, (c) two layers of felt and two layers of synthetic rubber.

The type of lamination which finds the largest application is the one consisting of two layers of felt and two layers of synthetic rubber i.e. a bottom layer of felt, a center layer of synthetic rubber, superimposed by a second layer of felt having a surface layer of synthetic rubber

(Continued on page P158)

ARALAC*

F. C. ATWOOD
Vice-President, Aralac, Inc.

As the production and technical men in charge of the quality and the output of a huge industry, your responsibility to your companies and to the public is very great. You require and you are entitled to every bit of information and technical fact that is available to help make the multitude of decisions confronting you in a day's work. The collection, evaluation and use of such information is part of your job. It is equally the job of your raw material suppliers to furnish you with all possible technical facts concerning the products they sell you, uncolored by sales propaganda and free from inconclusive evidence or wishful thinking. It is in that frame of mind that I come here tonight.

I should preface any discussion of technical fact that I may offer you with the restriction that all such offerings are made subject to change in the immediate future with due notice to you as consumers. In most encyclopedias of successful merchandizing, it is a rule that uniformity, unchanging quality and adherence to rigid standards is the essence of good faith with the customer. The company I represent and all its associated companies have what amounts nearly to reverence for such standards. Our production men are drilled in the requirements of a standard and uniform manufacturing technique. Their goal is to achieve such uniformity.

In spite of our basic reverence for uniformity of product, I must again suggest that any facts and figures I now offer are subject to change. We shall be diligent in keeping you informed of such changes and so far as the tempo of the time permits, we shall refrain from making any changes which will upset your manufacturing technique in the use of our product, Aralac. Two things only will cause us to make changes in our product from now on. Neither you nor we have final control of our business at this time. We say that the government runs our business. Actually, we are willing that this should be so for the common good and goal. If then, and for such reasons, we can no longer do some of the things we have been doing, we still have on the job the same technical staff which developed Aralac and we shall use the same ingenuity to prevent dislocation of our manufacture and we shall allow no reduction of our present standards. But you as consumers of Aralac are the principal reason we shall make improvements in the properties of Aralac in the future. And, of course, we would hardly make changes unless they were judged as improvements by a representative jury of opinion of your industry. I can say this advisedly because none of my group as yet could be classed as textile experts. We would not trust our own opinion of what is good for the textile industry nor would we force such an opinion on you. We shall concern ourselves only with facts. What Aralac becomes, what it does and where it goes is in your hands. We know that substantial improvements of our present quality are not only desirable but possible. The speed with which such improvements are made is tempered by several factors but will be pushed as rapidly as possible. So much for preamble and the qualifications of my facts. Now for the facts.

Man made protein fibers have been the subject of research for a long time. Rayon got its start solely to replace an expensive natural protein fiber, silk. The early history of rayon development suffered because of such an inadequate goal. Other researches were handicapped both by the search for a raw material from which to make fiber and by the lack of a fundamental goal as to the use of the fiber. I like to think that in our development of Aralac we have at least avoided these problems. We had available a large reservoir of a by-product protein, the value of which we wished to raise. We, therefore, had no raw material problem in the ordinary sense. If we raised the value of this raw material, we insured its flow into the market in adequate supply.

As a goal, we had only to make our fiber of such utility that it found for itself a suitable place in your industry. We have sought diligently to avoid the mistake of suggesting we were making a wool substitute. Early in our development we made the mistake of directing our efforts to producing a fiber for a fixed purpose, but this was soon rectified. We then sought to develop the fiber along the simplest and best lines and to find out after that where its highest field of usefulness lay. This has resulted in the use of Aralac in a number of unrelated and unexpected industries. I believe that Aralac is finding uses in textiles determined by its unique characteristics and by the imagination and ingenuity of members from your own branch of the industry.

Aralac is made from the principal protein in milk—casein. This protein is a mixture or grouping together of a number of amino acids. Such a composition offers us a great many amino, carboxyl and hydroxyl groupings on which to work and on which to hang other groupings which will modify and otherwise change and improve the quality of any fiber made from the protein. Casein is easily recovered from skim milk. If the pH value of the milk is lowered by acid addition or formation, the solubility of the casein is lowered until at its isoelectric point of 4.6 the protein reaches its minimum solubility and swelling and is precipitated out of the milk as a curd. It is this curd

*Presented at meeting, Philadelphia Section, Feb. 27, 1942.

suitably prepared which we use as a raw material for Aralac.

A variety of acids may be used to precipitate casein as a curd from skim milk. In this country, muriatic and sulfuric acids are the predominating acids used. Small amounts of lactic acid casein are prepared. In other parts of the world such as the Argentine, New Zealand, Australia and formerly France, much lactic acid casein was prepared and in this case the lactic acid is frequently formed by allowing the milk to self-sour. Sugar, which is one of the other constituents of skim milk, may ferment to yield lactic acid which, in turn, precipitates the casein.

The collection of this casein and the shipment of it to market may take place in a number of small isolated creameries or in a few relatively large creameries. At the present time, at some of the sources, casein is in competition with skim milk powder, with cheese and with other food products desired under war conditions. The question has been raised, therefore, as to whether or not casein might continue to be available in sufficient quantities to allow for an uninterrupted and expanded program of fiber manufacture. This question might be difficult to answer if Aralac were made by a company completely isolated business-wise from a basic source of the raw material; namely, milk. In the case of Aralac, however, as I stated earlier, so long as we were concerned with a by-product protein, we had no raw material problem. Our associated company, National Dairy Products Corporation, is very actively engaged as the largest single unit in the collection and distribution of milk products all over the world, so it is possible for our division to focus attention solely on the manufacture, improvement and utility of our finished fiber.

The casein comes to our factory at Taftville, Connecticut, where it is carefully blended in large lots prior to use. This blending insures uniformity of raw material just prior to the manufacture of the fiber. The blended casein is carefully dispersed or dissolved in water with suitable solvents. This involves proper adjustment of the viscosity to a uniform base and adjustment of any other factors including complete removal of heterogeneous aggregates or any adventitious material and certain other adjustments are required to insure clean, continuous spinning over long periods of time in substantial volume.

The dispersed syrupy-like casein is forced through spinnerettes into a coagulating bath. The regenerated casein, as fiber, is collected in a large wet tow and carried away from the coagulating bath. It remains in this tow form through a succession of hardening and molecule modifying treatments interspersed at times with washing and drying together with surface modifying treatments. The type, number and sequence of steps is varied and determined by the use to which the finished fiber is to be put. The treatments serve to change the casein molecule into a new resin compound. When the shipping department receives an order for the fiber, suitable selection from inventory is made and the tow then receives its final treatments and conditioning and is put through cutting machines to yield the desired length of staple. The cut staple is carried through suitably designed openers and blowers from which it goes into large blending rooms for final conditioning. Sufficient material is blended and the fiber is taken from this room in such a way that the equivalent of another blending is insured before it is dropped into a baling press and finally prepared for shipment.

While it is true that substantially any diameter fiber may be made, we have found that the quality and character of Aralac is such that products made with a fiber diameter distribution substantially equivalent to 50's, 60's and 70's wool or 30, 25, and 20 micron diameter on the average covers the principal uses in which Aralac has been successfully used to date. We have made as small as 9 microns and as large as 400 microns.

For some uses, a straight, uncrimped fiber is most desirable. Most of the Aralac for textile use has a natural wool-like crimp, but for a recent and totally different use, we developed a product now called "Wavecrepe" which has a relatively fine and permanent crimp. At the moment this material is sold only in top form and has just recently been made available in small quantities for the textile trade.

The manufacturing control of Aralac is of course accomplished by a continuous succession of routine plant controls at all stages of manufacture. The finished fiber, however, is subjected to a number of important and rigid tests. Careful sampling of each blend is made and these samples are subjected to one-hour boiling tests, which really are boiling tests, in that the fiber is submitted to a boiling in distilled water and the sample is allowed free and unrestricted movement in the boiling water. We have found that distilled water is much more chemically active to the fiber than an acid bath would be since the water is relatively alkaline to the fiber. At the same time, the sample is tested with suitable dye baths after different periods of scouring in order to determine the relative uniformity of dye intake throughout the sample of fiber and the resistance to certain types of dyes. In addition, we sometimes submit the fiber to so-called fulling tests, although if it will pass these other tests, particularly the boiling test, the fulling test has been found to be unnecessary.

We have been asked a great many times as to the best method for quantitative determination of Aralac in admixture with other fiber. We have tried a great many different tests, most of which were inaccurate and inadequate. A number of tests were originally suggested as used in Europe, a principal one of which included acid and enzymatic or pepsin digestion. For this test, however, we early set ourselves the goal of producing a fiber which would not be digested by enzymes under any condition, even the most favorable. Aralac cannot, therefore, be determined by this test.

Nor have we found any test which we could suggest without a number of qualifications. I can say that to date

the only test of any value available to us is one developed by Mr. Sieminski* of our group which is dependent for its success upon a fixed phosphorus content in Aralac. Certain modifications of Aralac which might be adopted in the future or possibly insufficient removal of the phosphorus deposited by phosphate scouring might modify the tests. In so far as we have come toward establishing the constancy of a phosphorus content of Aralac, we have found that the value of 0.820 per cent is a fair average and is plus or minus 0.015 per cent phosphorus.

We have also determined that wool, viscose, rayon, acetate rayon and cotton contain no appreciable amount of phosphorus. Rabbit fur appears to possess sufficient phosphorus content to invalidate this method for the determination of Aralac in admixture with rabbit fur.

The determination of the phosphorus content of a sample containing Aralac in admixture with wool, cotton or other rayons, does, however, appear to possess some merit, as a proximate method of analysis for Aralac and the following procedure is offered for what it is worth.

DETERMINATION OF PHOSPHORUS IN ARALAC

The following tentative method for the determination of phosphorus in Aralac can be applied to the determination of Aralac in admixture with wool, viscose rayon, acetate rayon, or cotton.

If an approximation of the Aralac content of the sample is known (as through microscopic examination) a sample equivalent to not more than 0.5 grams of Aralac is taken. The sample is dried and weighed, given a two-hour carbon tetrachloride Soxhlet extraction, and air dried. The sample is then given three 1-minute hot water rinses and again dried and weighed.

The sample is placed in a 300 ml. Kjeldahl flask, 15 ml. of conc. H_2SO_4 and 15 ml. of conc. HNO_3 are added, and the whole heated over a low Bunsen flame. The acid digestion is carried out with frequent additions of conc. HNO_3 until the liquid is colorless. This may take from 1-3 hours.

When the liquid is colorless or a light, limpid yellow, the flask and contents are cooled and transferred to a 400 ml. beaker by washing with about 100 ml. of distilled water. Any white precipitation is disregarded. Forty grams of ammonium nitrate are added. The solution made up to 150 ml. with distilled water and heated to 70° C. Seventy milliliters of acid ammonium molybdate reagent are immediately added with stirring and the whole permitted to remain overnight.

The precipitate is filtered through a Gooch crucible and then washed free of nitrates (about 20 washes) with an acid ammonium sulfate wash solution.

The ammonium phosphomolybdate precipitate is dissolved from the crucible with 50 ml. of dilute NH_4OH (1:10), 10 ml. of conc. H_2SO_4 are added, and the solution immediately passed through a Jones reductor and caught in an empty flask. The reduced solution is immediately titrated with N/10 KMnO . The percentage of phosphorus is

$$\% \text{ P} = \frac{\text{ml x N. of } KMnO_4 \text{ x } 0.000887 \text{ x } 100}{\text{wt. of sample}}$$

$$\% \text{ Aralac} = \frac{\%P}{0.820} \text{ x } 100$$

Acid Ammonium Molybdate Reagent

Solution No. 1. Place in a beaker 100 g. of 85 per cent molybdic acid, mix it thoroughly with 240 ml. of distilled water, add 140 ml. of NH_4OH (sp. gr. 0.90). Filter and add to 60 ml. of HNO_3 (sp. gr. 1.42).

Solution No. 2. Mix 400 ml. of HNO_3 (sp. gar. 1.42) and 960 ml. of distilled water.

When the solutions are cold, add solution No. 1 to solution No. 2 stirring constantly, then add 0.01 gram of ammonium phosphate dissolved in 10 ml. of distilled water, and let stand 24 hours. Filter.

Reference to the statement made above that Aralac is not digested by enzymes should dispose of a statement which has been recurrent in the literature but which should definitely be referred back to its original source. Four or five years ago, some Dutch tests on Lanital then being manufactured in Italy, indicated that Lanital was digested by certain bacteria. Like any other false statements and rumors, this original statement made a great many years ago on a product in no wise like Aralac has been repeated and expanded until recently statements have one believing that this statement is true of Aralac. Such is certainly not the case but whether or not we can cope with some of these erroneous statements, I would refer again to the fact that we had as our goal the manufacture of a fiber which would not be broken down and which would certainly have no more problems of this character confronting it than would wool, silk, or any natural protein fiber.

Several years ago I set myself up as a prophet and made the following statements as to what probably would be expected of a product like Aralac. The statement was as follows:

"American users of a protein-base fiber will doubtless demand a strength capable of withstanding reasonable carding, combing, and spinning operation without help from other fibers. They will require dyeing properties similar to wool, under the same conditions of dyeing, because casein fiber and wool will be frequently mixed. Felting properties should be good in mixtures with feltable materials. The product must have a permanency which will avoid any breakdown by bacteria, mold, etc. It must withstand all common cleansing agents under normal conditions of use. In general, a satisfactory fiber must go into a textile mill, be blended with other fibers, and withstand all the operations common to a textile plant without requiring any change in operating conditions.

"When, and if, a casein-base fiber is produced and offered to our domestic trade, which meets the above

*Now with Wellington, Sears Co.

requirements, it will doubtless find a successful use in many classes of textile goods. In addition, such a fiber will have many properties unique to itself and, without supplanting or interfering with the use of any present textile fibers, will add materially to the versatility of the textile industry."

We feel that we are not very far from meeting all those requirements and that is the reason a few months ago Aralac was offered to the textile industry.

However, after all we can do toward the improvement and perfection of Aralac at this time, please remember it is still a protein fiber. It is not cellulose, like cotton, viscose or acetate. In sizing, scouring, bleaching, stripping or dyeing, it should be treated with at least as much respect as you would accord to wool or silk in all reactions and treatments. The same is true of dyeing and drying temperatures. We are still a bit below the natural protein fibers in ability to stand rough wet treatments. Since Aralac will be found in many combinations with cotton and rayon, we suggest that the original tints be light so as to avoid stripping problems. From many comments I have heard, this suggestion is timely even when Aralac is not used.

Aralac is put through so many chemical treatments and washes during its manufacture, that the final fiber is essentially a new chemical resin when finished. It is a long way removed from the regenerated casein leaving the spinnerette. There is no reason to expect that the finished fiber will either carry or generate any odor other than that related to the last treatment to which it is subjected, such as finishing compounds, carding, and combing oil, soaps, etc. In this respect, it should be similar in its behavior to wool.

At the present time, shipments are being made at a rate better than five million pounds per year. How much we can increase this is not yet certain although I hope we may help out your present problems to some extent. We are most concerned that present uses of Aralac are suitable and in line with its unique characteristics. Certainly, none of us would gain much if Aralac is used as a wool substitute during the present emergency. We will help take care of any military requirements. We will cooperate in every way to find uses for which Aralac has a permanent and acceptable field. But we would decry any use wherein Aralac would be but a temporary substitute for wool.

We wish for Aralac that it find its way into the textile industry on its own merits and when and if conditions return to normal, Aralac will have become a new staple fiber low in cost but high in intrinsic value.

MEETING, SOUTH CENTRAL SECTION

THE South Central Section held their Winter meeting on Saturday night, March 7, at the Read House in Chattanooga, Tenn., with seventy members and guests present.

T. R. Smith, the national president of the association, gave a talk on the work being done by the association on the fastness properties of colors being used for defense work.

A paper was presented by P. J. Wood of the Royce Chemical Company on the history and uses of hydrosulfite and related products.

Respectfully submitted,

DAN TORRENCE, *Secretary.*

MEETING, NORTH CAROLINA STATE COLLEGE STUDENT CHAPTER

THE North Carolina State College Student Chapter, at its February meeting, had for speakers T. R. Smith, President of the Association, and W. A. Wolhar of Roanoke Rapids.

A motion picture was shown on package dyeing in the Wiscassett Mills in Albemarle, N. C. Along with the picture, Mr. Smith gave a lecture on the proper use of the dyeing equipment and the advantages of the different types of spools as to dyeing, handling, and winding.

At the completion of the picture and lecture an open forum was held with Mr. Smith and Mr. Wolhar answering questions.

Respectfully submitted,

WILLIAM R. IVEY, JR., *Secretary.*

Synthetic Rubbers—

(Continued from page P154)

upon it. This arrangement has been found to give good grease sealing when used as a packing or on a shaft where the oil level is below that of the seal.

The principle involved here is that the inner layer of synthetic rubber acts as a sealing medium to prevent the passage of oil while the inner felt, being absorbent, tends to lubricate the shaft to prevent scoring. The center layer of synthetic rubber serves as a secondary dam against the passage of any oil through the inner layer of synthetic rubber while the outer felt layer serves as a dust guard to prevent the passage of any dust or grit from the outside which might produce shaft scoring.

In Figure 9 (part D) is depicted an oil proof packing which consists of a felt core with a complete coating of synthetic rubber. This has found use as a packing in grooved channels.

The largest consumption of synthetic rubber at present occurs in the production of bullet-proof tanks for aircraft. The general solvent resistance of synthetic rubbers has encouraged their use for fuel hoses, air hoses, printers' rollers, laboratory tubing and stoppers, oil seals, gaskets, piston packings, motor mountings, and for many general applications where oil and solvent resistance are a requisite.

Unquestionably the greatest potential use for the synthetic rubbers will be for tires. Synthetic rubber tires have been subjected to the wear of ultimate mileages compared to those of natural rubber with good success.

In conclusion I would like to emphasize that analogously, to the creation of the American dye industry which resulted from the lack of self sufficiency in World War I, it is apparent that World War II will hasten our self sufficiency in rubber. The many superior properties of the synthetic rubbers should accelerate this evolution.

MEMBERSHIP APPLICATIONS

Senior

Margia B. Abott—Associate Professor, Simmons College, Boston, Mass. Sponsors: E. R. Schwarz, H. H. Broadfoot.

Curt Baeringer—General Manager, Eagle Dyeing & Finishing Co., Mt. Holly, N. J. Sponsors: A. E. Jones, Jr., R. M. Ritter.

William C. Bainbridge—Technical Director, H. Kohnstamm & Co., Brooklyn, N. Y. Sponsors: J. A. Barrington, C. A. Henlein.

Gordon Warde Bell—Foreman, Joseph Bancroft & Sons Co., Wilmington, Del. Sponsors: L. W. Roberts, C. B. Griffin, Jr.

Max Bender—Chemical Engineer, Aridye Corp., Fair Lawn, N. J. Sponsors: K. L. Dorman, A. A. Caddell.

Abram S. Berg, Jr.—Neatsfoot Oil Refiners Corp., Philadelphia, Pa. Sponsors: A. E. Jones, Jr., J. P. Conaway.

Gordon A. Berkstresse—Mill Manager, Roanoke Manufacturing Co., Roanoke Rapids, N. C. Sponsors: W. A. Wolhar, T. R. Smith.

Theodore August Betsch—Boss Dyer, Dutchess Underwear Co., Old Forge, Pa. Sponsors: L. P. Brick, C. D. Ehrengart.

Paul C. Bowers—Chemist, E. I. du Pont de Nemours & Co., Inc., Dye Works, Deep Water, N. J. Sponsors: P. H. Stott, C. A. Seibert.

Will George Brown, Jr.—Sales Engineer, Wallerstein Co., Inc., Winchester, Mass. Sponsors: R. E. Derby, J. E. Cummings.

Edward V. Burnthall—Textile Chemist, York Knitting Mills, Toronto, Canada. Sponsors: C. J. Mueller, T. Rostron.

John W. Chamberlin—Director, Research Laboratories, Troy Laundry Machinery Div., American Machine & Metals, Inc., E. Moline, Ill. Sponsors: G. H. Johnson, J. B. Crowe.

George J. Clavin—General Manager, Hardwick Woolen Mills, Inc., Cleveland, Tenn. Sponsors: J. Anderson, D. A. Torrence, Jr.

William P. Clement—Head Dyer, Kingsboro Silk Mills, Inc., Daisy, Tenn. Sponsors: F. F. Myers, T. J. Marler.

Robert Ernst—Chief Chemist and Dyer, Standard Dyers & Finishers, Inc., Los Angeles, Calif. D. F. Driscoll, J. C. Walker.

Philip L. Factor—Head Bleacher and Dyer, Boston Knitting Mills, Inc., Newton, Mass. Sponsors: L. Shapiro, H. C. Selya.

B. F. A. Fichter—Technician, Sandoz Chemical Works, Inc., New York, N. Y. Sponsors: J. E. Meili, J. C. Walker.

Hallet J. Foster—General Manager of Textile Printing, Velveray Corp., Fall River, Mass. Sponsors: J. R. Redmond, L. J. Sheehan.

William F. Gimpel—Chemist and Dyer, Carl Stohn, Inc., East Taunton, Mass. Sponsor: H. C. Selya.

Grafton B. Hale—Analytical Chemist, Penick & Ford, Ltd., Inc., Atlanta, Ga. Sponsors: R. W. Philip, P. G. Wear.

Willis F. Hargrove—Salesman, Quaker Chemical Products Corp., Knoxville, Tenn. Sponsors: D. A. Torrence, Jr., J. T. Bohannon, Jr.

Clinton B. Harris—Asst. Sales Manager, Dyestuffs Div., E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. Sponsors: P. H. Stott, C. A. Seibert.

Louis G. Hayes—Chemist and Salesman, Union Color & Chemical Co., Boston, Mass. Sponsors: C. A. Thornhill, L. Billings.

John J. Healy—Chemist and Dyer, Gonic Manufacturing Co., Gonic, N. H. Sponsors: G. K. Plotica, K. H. Schmatzler.

Hubert F. Hoffmann—Salesman, General Dyestuff Corp., Philadelphia, Pa. Sponsors: B. C. Bond, E. Empting.

Harry Jackson—Plant Supt., J. L. Stifel & Sons, Wheeling, W. Va. Sponsors: B. Verity, H. F. Holmes.

John Elwood Killinger — Manager of Technical Sales Service, Penick & Ford, Ltd., Inc., Cedar Rapids, Iowa. Sponsors: R. W. Philip, P. G. Wear.

William Kirk—Cost Clerk, Montreal Cottons, Ltd., Montreal, Canada.

Harold E. H. Knight—Dept. Head, Clarence S. Brown & Co., Inc., New York, N. Y. Sponsors: L. J. Roos, R. S. Lunt.

Alexander F Laube—District Manager, Sandoz Chemical Works, Inc., Paterson, N. J. Sponsors: J. E. Meili, W. W. Hales.

Richard H. Lewis—Chemist, Providence Dyeing, Bleaching & Calendering Co., Providence, R. I. Sponsors: R. W. Ward, J. L. Campanella.

Rudolph A. Lindenmaier—Chemical Dept., Sandoz Chemical Works, Inc., New York, N. Y. Sponsors: J. E. Meili, J. C. Walker.

Raymond Mace—In Charge of Laboratories, Manville Jenckes Corp., Manville, R. I. Sponsors: D. C. Hardman, E. J. Allard.

Roger W. Moister—Salesman, Michigan Alkali Co., Charlotte, N. C. Sponsors: T. W. Church, Jr., H. O. Pierce.

Hubert C. Normile—Technologist, War Dept., Quartermaster Depot, Philadelphia, Pa. Sponsors: W. H. Moon, T. H. Hart.

Malcolm C. Rawlinson — Dyehouse, Woonsocket Rayon Co., Woonsocket, R. I. Sponsors: D. C. Hardman, E. J. Allard.

Aubrey W. Rogers—Asst. Overseer of Dyeing, Muscogee Manufacturing Co., Columbus, Ga. Sponsors: T. A. Davis, J. S. Mitchell.

John J. Sandilands—Textile Color Chemist, United States Dyestuff Corp., Boston, Mass. Sponsors: W. H. Zillessen, W. R. Moorhouse.

Michael Schneider—Supt. of Dyeing, Bleaching and Finishing, Century-Beverly Corp., Pottstown, Pa. Sponsors: T. Mower, T. H. Hart.

J. Edward Seddon—Dyer, Buffalo Weaving & Belting Co., Buffalo, N. Y. Sponsors: T. F. Murphy, H. B. Fenn, Jr.

Edwin F. Slaughter—Salesman, Atlas Electric Devices Co., Charlotte, N. C. Sponsors: A. H. Gaede, E. C. Bertolet.

John J. Smith—Finisher, Chicopee Manufacturing Co., Chicopee Falls, Mass. Sponsors: F. T. Seery, W. P. Whitman.

Robert Rushworth Smith—Laboratory Technician, American Viscose Corp., Marcus Hook, Pa. Sponsors: C. Schlatter, L. S. Converse.

Frank Stutz—President, Better Fabrics Testing Bureau, New York, N. Y. Sponsors: O. F. Marks, H. C. Borghetty.

Francis E. Tarrh—Dyer, Archer Hosiery Mills, Columbus, Ga. Sponsors: F. W. Silver, N. M. Johnston.

Howard O. Whamond—Salesman, Merchants Chemical Co., Milwaukee, Wis. Sponsors: A. G. Alexander, N. W. Humbaugh.

Grover A. White—Textile Chemist and Colorist, Joseph Bancroft & Sons, Rockford, Del. Sponsors: W. W. Trowell, B. H. Little.

Alan S. Wrigley—Junior Chemist, War Dept., Quartermaster Depot, Philadelphia, Pa. Sponsors: E. W. Peters, T. F. Geiser.

Robert Gordon Yeaman—Dyer, Wm. Collie Woolen Mills, Appleton, Ontario, Canada.

Junior

Jack H. Anderson—Dyehouse Laboratory, Pepperell Manufacturing Co., Lindale, Ga. Sponsors: R. J. McCamy, C. R. Gill.

Lathrope K. Baker — Textile Chemist, North Georgia Processing Co., Toccoa, Ga. Sponsors: E. S. MacNeill, J. E. Gardner.

Frank A. Bateman, Jr.—Junior Inspector of Textiles, War Dept., Quartermaster Depot, Philadelphia, Pa. Sponsors: E. W. Peters, T. F. Geisser.

Scott Brodie—Research Chemist, American Viscose Corp., Marcus Hook, Pa. Sponsors: C. Schlatter, L. S. Converse.

Everett Wallace Counsell—Textile Chemist, United States Finishing Co., Norwich, Conn. Sponsors: L. H. Bailey, W. H. Cady.

H. Russell Cunningham—Paymaster, Uxbridge Worsted Co., Lowell, Mass. Sponsors: E. E. Fickett, H. C. Chapin.

Howard Lester Fogle—Asst. Overseer of Dyeing, Muscogee Manufacturing Co., Columbus, Ga. Sponsors: T. A. Davis, J. P. Harrison.

Karl H. Inderfurth—Salesman and Technician, Colloids, Inc., Newark, N. J. Sponsors: J. E. Bell, A. Malick.

William T. Johnson—Factory Representative, M. Werk Co., St. Bernard, Ohio. Sponsors: M. W. Moore, D. A. Torrence, Jr.

Arthur A. Margolin—Student, Massachusetts Institute of Technology, Cambridge, Mass. Sponsors: E. A. Schwarz, H. H. Broadfoot.

Tullio Cesar Peschiera—Chemist, National Aniline Div., Allied Chemical & Dye Corp., New York, N. Y. Sponsors: J. E. Loughlin, A. K. Gyzander.

Webster M. Price—Chemist, Aridye Corp., Fair Lawn, N. J. Sponsors: K. L. Dorman, S. Meeker.

Associate

Richard G. Bollman—Supt. of Body Dept., Geo. W. Bollman & Co., Adamstown, Pa.

James E. Conway—Salesman, Calco Chemical Div., American Cyanamid Co., Philadelphia, Pa.

William H. Cornils — Secretary, Color Analysts, Inc., Bloomfield, N. J. Sponsor: H. R. Tisdale.

Earle W. Harris—General Manager, A. T. R. Div. of Tinolan Co. of America, Inc., Philadelphia, Pa. Sponsors: A. E. Jones, Jr., H. B. Dohner.

Milton C. Haubois—Chemist, Alco Oil & Chemical Co., Philadelphia, Pa. Sponsors: A. E. Jones, Jr., J. P. Conaway.

Chester E. Heppberger—Salesman, National Carbon Co., Inc., Chicago, Ill. Sponsors: H. Boxser, V. T. Hartquist.

Edward Hilb—Calco Chemical Div., American Cyanamid Co., Bound Brook, N. J.

Robert C. Lucas—Chief Chemist, Lever Brothers, Ltd., Toronto, Canada.

Matthew A. Novak—Asst. Designer, Shawsheen Mills, American Woolen Co., Andover, Mass.

Saunders Ellis Peck—Salesman, Procter & Gamble Distr. Co., Atlanta, Ga. Sponsor: C. Mueller.

George Senn—Manager, George Senn Co., Philadelphia, Pa. Sponsors: A. E. Jones, Jr., H. B. Dohner.

Frank J. Sowa—Research Organic Chemist, Sowa Chemical Co., New York, N. Y.

John Staples—Salesman, Mathieson Alkali Works, Chattanooga, Tenn. Sponsors: D. A. Torrence, Jr., F. F. Myers.

Henry L. Young—Salesman, Aridye Corp., Fair Lawn, N. J.

Student

Henry Otto Albiez—New Bedford Textile School. Sponsor: Francis Tripp.

Kenneth W. Bean—New Bedford Textile School. Sponsor: Francis Tripp.

Gordon S. Bradley—New Bedford Textile School. Sponsor: Francis Tripp.

Arthur F. Cacella—New Bedford Textile School. Sponsor: Francis Tripp.

James A. Caton—New Bedford Textile School. Sponsor: Francis Tripp.

Frank O. Chase, Jr. — New Bedford Textile School. Sponsor: Francis Tripp.

Walter M. Clark, Jr.—New Bedford Textile School. Sponsor: Francis Tripp.

William W. Entwistle, Jr.—New Bedford Textile School. Sponsor: Francis Tripp.

Raymond A. Farland — New Bedford Textile School. Sponsor: Francis Tripp.

Warren Thomas Gregory—New Bedford Textile School. Sponsor: Francis Tripp.

Harry G. Grundy—New Bedford Textile School. Sponsor: Francis Tripp.

John Hilton, 2nd—New Bedford Textile School. Sponsor: Francis Tripp.

John E. Hughes, Jr. — New Bedford Textile School. Sponsor: Francis Tripp.

Donald Malick—New Bedford Textile School. Sponsor: Francis Tripp.

James Malick—New Bedford Textile School. Sponsor: Francis Tripp.

Emery G. Maynard—New Bedford Textile School. Sponsor: Francis Tripp.

Gene J. Mogilinicki—New Bedford Textile School. Sponsor: Francis Tripp.

Herbert P. Ohm—New Bedford Textile School. Sponsor: Francis Tripp.

Donald E. Pearson—New Bedford Textile School: Sponsor: Francis Tripp.

Jean A. P. Phaneuf—New Bedford Textile School. Sponsor: Francis Tripp.

Emile J. Remillard, Jr.—New Bedford Textile School. Sponsor: Francis Tripp.

Thomas P. Scott, Jr. — New Bedford Textile School. Sponsor: Francis Tripp.

Burton D. Sederholm — New Bedford Textile School. Sponsor: Francis Tripp.

Donald K. Whalley—New Bedford Textile School. Sponsor: Francis Tripp.

Harold F. Williams, Jr.—New Bedford Textile School. Sponsor: Francis Tripp.

Peter Henry Almond — University of North Carolina. Sponsor: Alfred Russell.

Merlen C. Bullock—Massachusetts Institute of Technology. Sponsor: E. R. Schwarz.

Fred S. Lack, Jr.—Georgia School of Technology. Sponsor: C. A. Jones.

Applications for Transfer to Senior Membership

Sylvester Aumuller
William J. Cramer, Jr.
Frank B. Gill
Robert N. Griswold
Charles Warner McGowin
Constantin Jose Monego
J. Elliott Pirie
Edson Kenneth Rice
George Robert Thompson

Corporate

Avondale Mills
Callaway Mills
Clark Thread Co.
J. & P. Coats (R. I.)
Colgate1Palmolive-Peet Co.
Crompton Co. and Crompton Shenandoah Co.
Eagle & Phenix Mills
Munsingwear, Inc.
Nashua Manufacturing Co.
Proximity Manufacturing Co.
Shakespeare Co.
Waldrich Co.
Jacques Wolf & Co.

MEETING, LOWELL TEXTILE INSTITUTE STUDENT CHAPTER

THE Lowell Textile Institute Student Chapter met on March 4th. Herbert Wilkinson, technical director of the Southbridge and Sturbridge Printing and Finishing Companies, presented a film entitled "Color Printing of Cotton Fabrics."

Respectfully submitted,

STANLEY SZOPA,
Secretary.

LAPEL BUTTONS bearing the seal of the Association may be purchased by members in good standing, from the Secretary for $1.50 each.

UNEMPLOYMENT REGISTER

Members of this association, who are without employment, should forward to the secretary a statement as to their qualifications and experience. This information will subsequently appear on these pages with an identifying key number. Employers are also requested to file with the American Dyestuff Reporter any vacancies which may occur in their business.—H. C. Chapin, Secretary, Lowell Textile Institute, Lowell, Mass.

NOTICE TO EMPLOYERS

Personal Histories and Employment Records of the following applicants are on file at the office of the American Dyestuff Reporter. Prospective employers may examine them without obligation.

Key: A—Laboratory and research; B—Dyeing or printing; C—Finishing; D—Sales; E—Instruction; F—Executive.

NOTE: PERSONS WHO HAVE OBTAINED EMPLOYMENT SHOULD NOTIFY THE SECRETARY OR THE AMERICAN DYESTUFF REPORTER AT ONCE.

A-1

Education—Graduate textile chemistry and dyeing course, Lowell Textile Institute, 1932. Special course in colloid chemistry at M.I.T.

Experience—Library work in spare time while attending school; five years as assistant chemist with knitting mill, duties consisting of testing and grading silk, testing of oils, soaps, dyes, finishes and other chemicals, making up specifications for various lines of hosiery and checking finished product, keeping a check on production costs, control of waste and irregulars, checking competing products and carrying on research to improve product and reduce costs. Woman; age 30; references.

A-2

Education—B.T.C., Lowell Textile Institute, 1933.

Experience—Textile chemist, cotton and rayon thread; agricultural chemist, protein, fat and mineral analysis; special Federal inspector on textiles, New York City; U. S. inspector, war department; chemist-spotter, dry cleaning experience. Age 32; married.

A-3

Education—B.S. in chemistry, Lehigh University.

Experience—Experimental engineer and analytical chemist, 8 mos.; assistant superintendent of silk corporation, assisted in planning and directing production, in charge of laboratory, technical work, personnel, purchasing, etc., 2 years; inspector of ordnance material, to the present. Seeks position as chemical engineer or chemist.

Age 25; single; references.

A-B-9

Education—Textile School Graduate; Alexander Hamilton Institute Business Course.

Experience—Mature, executive type of textile chemist and colorist with over twenty years' broad general experience in factory, laboratory, purchasing and all around business procedure. Good correspondent. Excellent personality. Wholesome appearance. Fine speaker. Literary and artistic ability. Real color sense. Possesses fund of factual information about material things in a wide range of industries. Capable of meeting the highest type of clientele and planning and directing the efforts of all types of personnel. Desires supervisory, contact, promotional or sales work. Willing to prove ability and versatility.

Age 44; American born; New England Yankee ancestry; married.

A-B-16

Education—3 years analytical textile chemistry and 2 years textile dyeing at Rhode Island School of Design.

Experience—6 years assistant research chemist at cotton finishing plant. Had charge of putting all research into production; complete study of starches, dextrines, gums, resins, finishing oils, softeners and sulfonated oils; considerable microphotography experience; wash and light tests on dyestuffs; knowledge of all cotton finishing operations; experience in water treatment; recent experience as dyer of wool, cotton, rayon (stock and piece goods), and mixtures. Seeks position as chemist, dyer or laboratory technician.

Age 30; American; married; references.

A-B-17

Education—Graduate of Franklin Union and Lowell Textile Institute, 1942.

Experience—1936 until present as assistant dyer in hosiery dye works. Experienced on full fashioned and anklet hosiery, handling wool, cotton, silk, rayon and nylon and combinations; has charge of weighing dyestuffs, testing and shade matching; experience with hosiery dyeing machines of all sizes. Seeks position as assistant dyer or laboratory technician.

Age 24; married; references.

A-B-18

Education—Graduate Philadelphia Textile School, 1940.

Experience—Has experience as assistant chemist and trouble shooter in silk dyeing and finishing plant; as manager of laundry store; and as printer and colorist in screen printing plant. Seeks position in laboratory and research, dyeing, printing or finishing.

Age 21; single; references.

A-B-C-F-1

Education—Textile Institute course in Dyeing and Chemistry; Extension work at Brown University; Executive Training with Alexander Hamilton Institute of New York, N. Y.; working knowledge of one foreign language.

Experience—Dyeing executive on all types of textiles including stock, yarns in the skein, warp and package, and piece goods. Thorough knowledge of all classes of dyes and dyestuffs and their successful practical application in the plant. Extensive knowledge of all types and makes of equipment for dyeing, bleaching, mercerizing and finishing. Laboratory practice in testing, standardizing, purchasing, costing, planning and checking processes, and market analysis. Good manager of personnel for better efficiency in retaining friendly labor relations. Conversant with modern methods for quality production economically secured through better coordination and correct alignment in processing, on cotton, viscose and acetate rayon, silk, wool, worsted, and mixtures. In excellent mental and physical health; excellent references.

A-B-C-F-3

Experience—Broad experience since 1906 as overseer of finishing, general researcher, trouble shooter, overseer of dyeing, general superintendent, mill manager. Experienced in woolen, worsted, cottons, unions and mixtures. Recently specialized in men's wear cottons. Seeks position as overseer of finishing or dyeing, assistant superintendent, superintendent or manager.

Age 53, married; references.

A-C-D-1

Education—Chemistry, Temple College, Philadelphia, evenings. Dyeing and textile chemistry, Philadelphia Textile School.

Experience—Employed about 18 years in textile mill, becoming chemist; 5 years as superintendent of finishing on silk and rayon ribbons; 10 years as salesman of chemicals and textile specialties in eastern Pennsylvania and parts of New Jersey; has some knowledge of the processing of all textiles. Seeks position as salesman with well known company.

Age 48; married.

B-10

Education—2 years chemistry, 2 years textile chemistry and dyeing, Lowell Textile Institute, evenings.

Experience—4½ years dyeing and bleaching hosiery, specializing in children's and infants' hose; 3 years assistant dyer, dyeing and bleaching cotton, mercerized and unmercerized, wool, wool-cotton, wool-rayon and wool-silk hose. Seeks position as second hand, assistant dyer or laboratory assistant in hosiery mill.

Age 27; single; references.

B-D-1

Education—High school graduate; textile chemistry, Textile Evening High School, New York City; accounting; typist.

Experience—from 1935 to present employed as colorist with screen printing plant in New York City. Experienced with all types of fibers and all types of dyes. Shade matching. Versed in accounting, typing, modern office procedure and sales promotion. Able assistant to busy executive. Age 46; single; references.

TRADE NOTES • NEW PRODUCTS

OBITUARY

C. WALTER LOTTE

C. WALTER LOTTE, president of the Lotte Chemical Co., died on March 20th in Paterson General Hospital, Paterson, N. J., at the age of 47.

Mr. Lotte was born in Paterson and was graduated in 1914 from Bucknell University. In the World War he served in France as a captain. At the end of the war he joined the National Silk Dyeing Co. and was made a member of its board of directors in 1923 and manager of its Dundee, N. J., plant. He resigned in 1930 to become president of the Lotte Chemical Co.

Mr. Lotte was active in political and civic affairs in Paterson. He was a member of the Paterson Board of Public Works from 1929 to 1938, serving several terms as president. In 1940 he was named to the Board of Finance of which he later became chairman. He resigned this position a few weeks ago because of ill health. He was president of the New Jersey Y.M.C.A. from 1923 to 1925, president of the New Jersey Christian Endeavor Union from 1920 to 1925, a director of the Paterson Y.M.C.A., president of the Paterson Community Chest in 1940 and president of the Paterson Chamber of Commerce in 1935. He was a member of the American Association of Textile Chemists and Colorists.

Mr. Lotte is survived by his wife, a son and a sister.

LLOYD B. EDGERTON

LLOYD B. EDGERTON, Vice-President of the Philadelphia Quartz Company, Philadelphia, Pa., died March 15 at the Presbyterian Hospital, that city, after a long illness. He was fifty-five years of age. Born in Barnesville, Ohio, Mr. Edgerton graduated from Ohio State University, Class of 1909. After obtaining his degree of Mechanical Engineer, he was associated with General Electric Company at Schenectady, N. Y., in their Steam Turbine Testing and Service Department. In 1913, he entered the employ of the Philadelphia Quartz Company, assuming charge of the Engineering Department. He was appointed Works Manager in 1930, Director in 1934 and Vice President in 1935. He was a member of the American Society of Mechanical Engineers and the Engineers' Club of Philadelphia.

Mr. Edgerton is survived by his wife, two sons, and a daughter.

• APPOINTED GENERAL MANAGER

Earl S. Dunlap, for the past six years superintendent of dyeing and finishing for the Belle Knitting Corp., Sayre, Pa., has resigned that position to become general manager of Snow White Bleachery, Inc., Royersford, Pa.

News of the W. P. B.

• RAYON FOR WORSTED INDUSTRY

Producers of viscose rayon staple fiber were ordered on March 16th by the War Production Board to set aside and make available to the worsted industry a specific part of their monthly production.

The action was taken in two amendments to the Wool Conservation Order and was done to enable the worsted industry to experiment in the production of blended materials, in order to obtain the greatest possible yardage from the amount of new wool allocated for civilian use under M-73.

The first of the amendments (Amendment No. 2 to M-73) directs rayon staple fiber producers to set aside each month for worsted manufacturers such amount of his production as may be designated by the Director of Industry Operations of the WPB. From this amount set aside each worsted manufacturer may purchase during March the equivalent of one per cent of his basic quarterly wool poundage.

The second amendment (Amendment No. 1 to M-73 amended and extended) applies to the second quarter. While the amount of rayon to be made available monthly to the worsted producers is not specified, in this amendment, the viscose producers have already been notified by the WPB that during April they will have to set aside for the worsted industry twice the amount they were required to set aside in March. The amounts to be set aside in May and June are now being studied.

• OPA AND WPB INFORMATION

Official texts of over 600 OPA and WPB price schedules, limitation orders, allocation rulings, preference ratings, amendments and interpretations have just been made available by the N. Y. Journal of Commerce for distribution among the nation's merchants and manufacturers. A Price and Priority Index of all existing Government regulations covering a wide product range from acetone to zinc has been compiled for handy reference purposes.

OPA price schedules were inaugurated in the machine tool industry over a year ago and are now in effect on well over a hundred products. "M" orders regulating the flow of materials came along shortly afterward and remain in effect despite the abolishing of the OPM. Limitation orders restricting the output of manufactured goods were first applied on motor trucks in August of last year. Adjustment to a wartime economy hit its peak in Mid-February when as many as 18 different orders were issued by the various Government agencies on a single business day.

Individual texts as published in the columns of the Journal of Commerce are still available in single copies or bulk quantities. Copies of the complete index may be had without charge by addressing the New York Journal of Commerce at 63 Park Row, New York.

• OFFICER'S UNIFORM FABRICS

The War Production Board on February 24th issued Amendment No. 1 to Wool Conservation Order M-73 providing that fabrics to be used in the manufacture of officer's uniforms be classified as fabrics used in defense orders. The amendment gives such fabrics a priority rating of A-10.

Uniforms covered by the amendment are for Army officers, Navy and chief petty officers, Marine Corps officers, Coast Guard and chief petty officers, Coast and Geodetic officers, U. S. Military and Naval Academy and training school students, and Maritime Commission employes.

The amendment includes a clarification providing that the restrictions on the amount of wool that can be put into process apply only to the person actually owning the wool.

• PRIVATE UNIFORMS

Wool for uniforms for the Reserve Officers Training Corps and for students taking state or private military training is not included in the order giving a priority rating of A-10 to military uniforms. (See item directly above).

Many persons have erroneously interpreted "Training Schools" to mean the R.O.T.C. in colleges and high schools and state and private military schools, which are not entitled to the A-10 rating for wool for uniforms because they are not U. S. Government Training Schools.

• RUBBER THREAD

Arthur Newhall, Chief of the Rubber Branch of the War Production Board, and R. R. Guthrie, former Chief of the Textile Branch, said on February 26th that rubber would no longer be available for rubber thread for the manufacture of corsets, girdles, brassieres, and foundation garments for general use.

Provision will be made for surgical-type garments to be manufactured according to specifications now being prepared by the Textile Branch of the WPB.

"This decision," said Mr. Newhall, "is in

accord with other decisions to eliminate rubber from all civilian products. The very small amount of rubber allocated for civilian uses from now on will go only into such products as industrial equipment and a restricted list of health supplies which are virtually as necessary as military products."

"This action is necessary," said Mr. Guthrie, "because of the acute rubber situation, when every pound of rubber saved contributes to the war program. Every effort will be made to make available to the industry other materials with which to provide for essential foundation garments."

• DYESTUFF ADVISORY COMMITTEE

In the item on the formation of a dyestuff manufacturers industry advisory committee which appeared in our issue of February 16th, page 95, the name of E. M. Maxwell, National Aniline Division, Allied Chemical & Dye Corp., was omitted as a member of the committee. This committee functions under the bureau of industry advisory committees of the War Production Board.

• TEXTILE MACHINERY INDUSTRY

The American textile machinery industry is engaged in the manufacture of direct war materials as well as repair parts and machinery for the production of the yarns and fabrics needed for military and essential civilian requirements, R. S. Dempsey, Chief of the Textile Machinery Section of the War Production Board, said recently.

"By the middle of 1942 the big producers will have completed their tooling-up and about 40 to 50 per cent of their capacity will be on ordnance work," Mr. Dempsey said.

"The other half of the industry's capacity will be devoted to the production of parts for maintenance and repair of existing textile machinery, and the manufacture of new equipment for mills engaged in the production of goods required to clothe the Armed forces and for essential civilian clothing.

"Only those mills now producing or which will produce goods on which there are present or anticipated shortages will be able to get new machinery.

"Machinery now being built is going first to those mills which will make duck, combed yarn and combed twills, and other constructions on which the Army and Navy are not able to fill their requirements according to schedule. Machinery for these purposes is being accorded relatively high preference ratings. As the size of the Armed forces increases, it is anticipated that further shortages will arise and the policy will be to allot machinery only to those mills that will increase their production of war goods. This will apply also to machinery for replacement of wornout equipment. If a mill is running on war goods, or it can no longer run some of its units, that mill will be given consideration for replacement machinery.

"When this country entered the war in December, there was a considerable quantity of textile machinery under contract. Most of this machinery was intended to make goods that are not essential to the Army and Navy or civilian needs. Unless this machinery can be changed over to make needed goods, delivery of this machinery must be indefinitely postponed.

"There is no time to build new mills or to put additional equipment in place to relieve shortages. The job must be done by using all the machinery in place to produce quickly those goods that are vital to the War Program. It is possible to convert some machinery units, to make goods they have never made before. This conversion must be accomplished without delay."

• NEW TEXTILE CHIEF

Philip D. Reed, Chief of the Bureau of Industry Branches, recently announced the appointment of Ben Alexander as Acting Chief of the Textiles, Clothing and Leather Goods Branch.

Mr. Alexander, who succeeds Robert R. Guthrie, has been president of the Masonite Corporation of Chicago since its founding in 1926. The firm manufactures hard-pressed fiber board.

Mr. Alexander came to Washington March 1 to serve as a special assistant to Mr. Reed.

Mr. Alexander was graduated from the University of California in 1917. He served as an infantry captain in the last war and still holds that rank as a reserve officer.

• CLEANING OF METALS

Fabricators of metals were warned on March 2nd by the Chemicals Branch, War Production Board, to investigate every possible cleaning method other than chlorinated solvents applicable to their operations.

A shortage in chlorinated solvents already existed, caused by the vast increase in metal fabricating, the Branch said, and the situation will get worse, instead of better, as time goes on.

Manufacturers with war contracts will be affected as well as others, the Branch pointed out, and continued extension of the use of chlorinated solvents will not be possible.

• GENERAL RELEASE

General Dyestuff Corp., 435 Hudson Street, New York City, has recently released a circular describing the following product:

Benzo Blue BX Conc.—a direct blue of fairly bright, reddish shade. It is said to combine high tinctorial strength with low cost. It is stated that it is of value for all dyeing purposes in which ordinary direct color fastness is sufficient. At the boil, it produces cotton-wool unions of good uniformity, at about 150°F, the wool is stained comparatively little and can be kept white by the addition of Katanol W or WB Conc. to the dyebath. Circular G-310.

• SOCMA MEETING

The regular monthly luncheon meeting of the Synthetic Organic Chemical Manufacturers Association of the U. S. was held at the Chemists' Club, New York City, on Wednesday, March 11th. C. T. Thompson, chief, plant facilities section, materials division, chemicals branch, War Production Board, addressed the meeting, outlining the prospective work. A discussion period followed. The next meeting will be held on Wednesday, April 8th, and the outing will be held at Skytop, Pa., on June 5th and 6th.

• MEN'S HAT COLORS

In the interests of conservation and national defense, the Textile Color Card Association is not issuing any new colors for men's felt hat bodies for Fall 1942, it was announced recently by Margaret Hayden Rorke, managing director. This decision was reached at a meeting of the organization's color committee representing leading firms in the men's hat industry.

However, because of the continued style importance of the five colors for men's felt hats created for the Spring 1942 season, namely, *Belmont Grey, Club Blue, Saratoga Blue, Stroller Brown and Town Taupe*, these shades are again recommended for promotion during the 1942 Fall season, Mrs. Rorke stated.

As all of the above colors already appear in the 1942 Spring Color Card for Men's Felt Hat Bodies, the Association will not, in the interests of conservation, issue new cards to its members, but will make up a limited number of 1942 Fall cards, portraying the five repeated colors, for those who wish to purchase a few additional copies.

• THIALENE

W. F. Fancourt & Co., Philadelphia, has just announced the commercial issuance of Thialene, a new product for treating high and low twist rayon which is claimed to insure beautiful sheer hose.

It is reported to hold its twist and knit smoothly, giving a clear and even stitch.

A combination oil and size, Thialene binds the filaments and lubricates the yarn in one operation. Used in the throwing operation, the new product may be applied by either the solvent or aqueous methods.

According to its maker, large scale tests have proved that Thialene works equally well with rayon or Bemberg, oiled or unoiled. It is stated that it has a natural tendency to preserve the yarn's elasticity and since it is self-emulsifying, Thialene is easily removed in the scouring operation. Tests are also said to indicate that the product, which requires no special equipment, is not abrasive or corrosive to metal.

• RECRUITING TECHNOLOGISTS

About a year ago the Federal Civil Service Commission began a recruiting drive for technologists. The number of persons on the employment lists now established is not sufficient for today's war-time needs. Accordingly, the Commission has recently reissued the announcement of these opportunities for Government employment with slightly modified requirements. Salaries for the positions range from $2,000 to $5,600 a year. Applications may be filed until further notice with the Commission's Washington office.

By technologist the Commission means a person experienced in "the necessary production, engineering, and scientific research work essential for the successful operation of an industrial plant, where such plant operation is based upon a thorough and expert knowledge of a branch of an applied science," such as explosives, fuels, plastics, rubber, minerals, or textiles.

For the Junior positions ($2,000 a year), applicants will no longer have to take a written test, and, as before, no written test will be given for the higher positions. The maximum age limit for all the grades has been raised to 60 years.

Copies of the announcement (No. 188), and the forms for applying, may be obtained at first- and second-class post offices, or from the Civil Service Commission, Washington, D. C.

• CALCO SHADE CARDS

Two new colors have recently been added to the line of colors produced by the Calco Chemical Division of the American Cynamid Company.

First is Calcochrome Orange LW, which is a color recommended by the manufacturers for better grades of men's wear as a component in the formulation of brown or mode shades. It is said to be of good fastness to light and to have excellent properties.

The second color is Calcochrome Brown RV Conc. This color is said to offer extreme fastness to light and possess exceptionally good dyeing properties. It is recommended by the manufacturer as a brown component in formulations for producing Army and Marine Corps Olive Drab.

Shade cards of these colors may be obtained by writing Calco's Advertising Department at Bound Brook, N. J.

• OFFICERS FOR TEXTILE EXPOSITION

Textile students of North Carolina State College elected Kenneth A. Shinn, Jr., superintendent, and William F. LeGrand, assistant superintendent of the 23rd annual Students Textile Exposition which will be held on April 30. Mr. Shinn is a son of K. A. Shinn, superintendent of Cannon Mills No. 8 at China Grove, and Mr. LeGrand is a son of R. T. LeGrand, treasurer of the Shelby Cotton Mills at Shelby, N. C. Both those young men are members of the senior class and have made good scholastic records at North Carolina State College. Mr. Shinn is also president of the State College Chapter of Phi Psi, national textile fraternity, and Mr. LeGrand is president of the Tompkins Textile Society.

Other members of the senior class who were honored by their fellow students are as follows:

Foreman of yarn manufacture—W. S. Williams, Jr., Middlesex, N. C.

Foreman of weaving—Robert L. McLaughlin, Pittsburgh, Pa.

Foreman of designing—W. M. Sutton, Rocky Mount, N. C.

Foreman of textile chemistry and dyeing—T. J. Sarandria, West New York, N. J.

Foreman of knitting—J. Fred Blue, Carthage, N. C.

Foreman of wool manufacture—George W. Funderburk, Jr., La Grange, Ga.

• APPOINTED TO CHEMICALS STAFF

Appointment of Francis B. Hillhouse to the Chemicals Staff of the Bureau of Foreign and Domestic Commerce was announced recently by the Department of Commerce.

Born in New Haven, Connecticut, Mr. Hillhouse received a B.A. degree from Yale University in 1925.

Mr. Hillhouse was employed by the National Aniline and Chemical Company from 1927 until his appointment to the Bureau of Foreign and Domestic Service. He spent several years in China and Japan representing the National Aniline and Chemical Company in the sale of dyes.

He will be associated with J. N. Taylor in the Organic Chemical Section and will serve under C. C. Concannon, Chief of the Chemical's Staff and Industrial Consultant on Chemicals.

• APPOINTED MANUFACTURING SUPERINTENDENT

Furnam G. Carroll, of the Sales Development Department of the American Viscose Corporation, has been transferred to the company's Marcus Hook, Pa., plant as Manufacturing Superintendent, it was announced recently.

Mr. Carroll attended Clemson College, Clemson, S. C., where he studied mechanical engineering. He was formerly overseer of spinning, winding, and dyeing at Judson Mills, Greenville, S. C. Mr. Carroll joined the American Viscose Corporation in January, 1939, and since that time has been the senior man in charge of field work on "Fibro" rayon staple fiber production, particularly in the cotton trade, for the production of the company's plants at Parkersburg and Nitro, W. Va., Front Royal, Va., and Meadville, Pa.

• FLAX

In announcing the release of a revised edition of a 32-page bulletin dealing with the "Production and Utilization of Flax and Its Products," Franklin W. Hobbs, Chairman of the Board of Directors of the Textile Foundation, said:

"A widespread interest in flax production, preparation and utilization in the United States impelled the Textile Foundation early in 1934 to call together about twenty-five people for a discussion of the subject from all angles. The desirability of securing additional information and factual data became apparent at the conference, and the Foundation, thereupon, authorized a series of experiments and appointed a committee to plan and define the scope of the studies.

"H. H. Willis, Dean of the Textile School at Clemson, S. C., took charge of the studies and a year or so later submitted a report which encompassed the following subjects: (1) growing of flax, (2) decorticating of flax, (3) degumming of flax chemically, (4) spinning of flax fiber on cotton and other spinning equipment, and (5) manufacture of chemically treated flax into paper.

"Requests for the report came from all over the country and were in such volume as to soon completely exhaust the available supply. Demands for copies continued unabated and last summer the Foundation authorized the prepararation of a revised edition. At the request of the Foundation, Warren E. Emley, Chief of the Division of Organic and Fibrous Materials, National Bureau of Standards, and a member of the original Flax Committee, undertook the revision.

"The former report was concerned chiefly with the possibility of raising flax in the Southeastern States—a question of primary importance at that time. Mr. Emley's re-

vision takes a broader view of the National scene, and includes discussions of not only the experiments in the Southeast, which are still being continued, but also of the utilization of flax by the spinning and paper industries, and of the flax farms of Oregon."

The bulletin may be secured by sending 10 cents in coin or stamps to the Textile Foundation, 10 East 40th Street, New York, N. Y.

● MARCH TEXTILE RESEARCH

Fundamental research on fiber properties and manufacturing techniques will make this country the leading textile producer of the world, according to Peter M. Strang, in the March issue of *Textile Research*, official publication of Textile Research Institute, Inc., and the Textile Foundation. To carry out this research, a strong central organization, similar to the Shirley Institute, in England, is needed. If each mill in the country were to spend an amount equal to 2 per cent of its annual sales on research and the research was conducted independently in each mill, the present status of the industry would not be changed. Each mill might benefit to some extent from its own efforts, but the returns to the industry would not be commensurate with the expenditures. On the other hand, a central organization, staffed with the ablest scientists would be able to eliminate many of the bottlenecks to progress which have hampered the textile industry in the past.

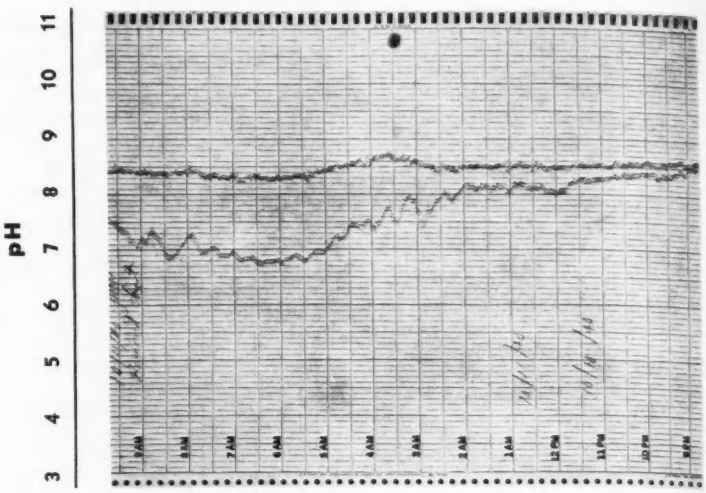
How research directed toward the improvement of milk bottles, led to the development of Fiberglas yarns and fabrics is described in another article in the March issue of *Textile Research*.

Other articles in the March issue of *Textile Research* discuss new methods and new instruments for evaluating textile finishes and finishing processes; a recently developed method for determining the load to remove crimp in cotton yarn; and the properties of flannels made from two types of wool.

● pH RECORDER

Now, it is stated, simultaneous records of pH at separate and independent points in a fluid-flow system can be utilized to provide a continuous "before and after" picture of pH that enables the operator to continuously see the effectiveness of the process or treatment in use, and accordingly, guides him to attain best results.

The photograph shows an actual record from the condensate system of a large utility generating plant, where such guidance is said to have helped to solve the important problem of turbine blade deposits. Already operating in central stations, this new development, it is claimed, should prove of interest not only to power plant operators but to engineers and executives in the process and other industries where far-reaching economies may be influenced by the pH at different stages in a process or treating operation.



Record of pH from the condensate system of a large utility generating plant.

Such pH records render it easy to detect changes in operating conditions, thereby making possible the output of a more uniform product and the elimination of waste. The new instrument which provides these records is conventional in appearance but is said to incorporate an outstanding advance in circuit design that permits installation of the measuring electrodes at separate and independent sampling points in the plant. They are connected electrically to the recorder which may be a considerable distance away.

The first application of the new multipoint pH Recorder was made in the power plant field, where corrosion of boiler systems is largely influenced by the pH of the feedwater. It is stated that continuous records from the instrument have proven so useful that operators of the original installation have already put additional units to work.

Multi-point pH recorders may provide guidance in textile mills, particularly in the wet processing of wool where improper pH control will result in damage to fibers and where the effectiveness of scouring and bleaching agents is also dependent upon proper pH values. Use of the instrument in cotton and rayon mills is said to be indicated where desizing by acid or enzymes, or where carbonizing, bleaching, dyeing, and after mercerizing, and where other wet processes are involved.

This development comes from the Cambridge Instrument Company, 3732 Grand Central Terminal, New York City.

● CALCO BULLETINS

In line with its policy of aiding textile concerns in the conversion of their plants from civilian to war business, Calco Chemical Division of the American Cyanamid Company, Bound Brook, N. J., has issued three new bulletins.

The first is called Bulletin No. 634. It gives the specifications and recommended dye formula for the vat dyeing of Government khaki uniform twill. This cloth is required by the Government for U. S. Army uniforms.

The second is called Bulletin No. 635. It gives the same information for the vat dyeing of U. S. Army herringbone twill. This cloth is used for the manufacture of work suits required for enlisted men of the Army.

The third is called Bulletin No. 636 and gives information on olive drab vat dyeing of wind-resistant cotton cloth, which cloth is used for windbreakers.

Copies of these bulletins may be obtained by writing the Advertising Department of Calco at Bound Brook, N. J., mentioning the bulletin number or numbers desired.

In addition to the three bulletins mentioned above, Calco has also issued a new technical bulletin entitled "The Priorities System as Related to the Chemical Industry." This bulletin summarizes the various controls which have been established by the War Production Board. It also contains an index of the various commodities on which M, P, L, and price schedule numbers have been issued.

Copies of this bulletin may also be obtained by writing Calco's Advertising Department and asking for Technical Bulletin No. 648.

PURIFYING STEAM

for Process Work

C. H. S. TUPHOLME

ONE of the aims of the engineer responsible for the control of steam generating plant is the production of clean dry steam, whether for use in steam engines, turbines or for process heat. Trends in boiler design as a result of the demand for economies in steam production have, in many cases, been prejudicial to steam quality and, as a result, there has been an intensified interest in the mechanism of steam contamination and its measurement and correction.

When boiler water is entrained in steam, it leaves deposits of dissolved solids in steam mains and valves, superheaters and turbines, and in the steam heating plant, and if such deposits occur to an appreciable extent they are soon reflected in loss of efficiency or damage to the equipment. The phenomenon which occurs when boiler water is carried over with the steam is frequently loosely defined, but as a result of the work of a number of investigators there is now a general agreement as to these definitions.

Priming is the term usually reserved for the propulsion of liquid into the steam drum by extremely rapid, almost explosive, boiling of the water at the heating surfaces. It is a spasmodic type of behavior, as contrasted to the steady carry-over which may characterize normal operation. When priming occurs, the entire column of water in a tube may become filled with steam bubbles, so that density of the mixture is decreased and it expands rapidly into the drum, expelling water into the steam space and the steam outlet tubes. A more constant phenomenon which also accounts for steam contamination is foaming, which occurs when bubbles of steam rising from the heating surfaces produce a layer of foam on top of the water. The foam may fill the steam space to such an extent that some of it enters the steam tubes. In addition to priming and foaming there is also the propulsion of water into the steam space by the bursting of bubbles which, even in the absence of much foam, will result in a relatively small and fairly steady entrainment of moisture into the steam.

It is generally recognized that high pressures are less favorable to foaming and priming than are low pressures since at high pressures the formation of bubbles is retarded. Working with an experimental boiler, two investigators found that as the pressure is reduced from 155 to 70 lb., four to five times as much boiled salines were carried over with the steam. In an experimental boiler studied by another authority it was possible to look through the drum by means of opposite sight glasses, an incandescent light being installed behind one of these. It was found that the steam was opaque at high pressure, due to the bursting of bubbles which seemed to be confined almost entirely to the surface, while the water was transparent. As the pressure was lowered the water became opaque because of the bubbles formed, culminating in a thick foam on the surface, and the steam became transparent.

Most engineers know that priming and foaming are prompted by an excess of soluble salts and precipitated sludge in boiler water, though the manner in which they exert their influence is not entirely established and has been the subject of much study. Attention has mainly been directed to seeking the mechanism by which dissolved and suspended solids assist the formation of foam. It is also known that the ability of bubbles to form on the surface of boiling water is related in some manner to substances in the water. If a bubble of steam rises in perfectly pure water it will penetrate the surface and pass into the air without forming a film, even for an instant. When two bubbles collide under the surface of pure water they merge instantly to form a larger bubble and this also passes to the space above the water without remaining on the surface. On the other hand, solutions such as boiler salines have the ability to form films that constitute bubble walls, and even though these have only a momentary existence, they permit the formation of bubbles on the surface of the water, sometimes in such numbers as to produce foam. When steam bubbles are formed in boiler water, at the heating surfaces in the tubes, they are small because of the high pressure exerted on them. When they rise through the water they do not coalesce because a film separates them, and a film persists when they push up the surface of the water. There is thus built up on the water a layer of small bubbles characterizing a foam.

All boiler feed water, even when taken from evaporators, will contain some suspended solids, the nature and amount of which varies greatly. Mud, wastes, certain types of boiler compounds, loose scale, calcium and magnesium compounds and many other substances, when present as suspended matter, will cause foaming under some conditions. In the light of past experimental work, practical experience dictates that judgment must be reserved as to any possible negative effect of boiler sludge on foaming. It is probable that boiler operators will continue to believe it necessary to limit the suspended matter, as well as the dissolved solids, in the boiler water by blowing down.

When boiler feed water is drawn from a supply which is polluted with industrial wastes, serious steam contamination may result. This is particularly the case where sewage or industrial waste containing vegetable oils constitutes a

portion of the polluting substances. The presence of such products results in the formation of soaps, greatly increasing the foaming characteristics. Similar effects may be encountered when the feed water supply is contaminated with wool-scouring wastes, tannery effluents, meat packing wastes and other types of industrial by-products. Frequently these materials will volatilize at relatively low temperatures so that even where evaporators are used feed waters still possess foaming characteristics as a result of greases or oils passing over with the vapor from the evaporator.

Because of these conditions some form of supplementary steam purification is rapidly becoming essential in up-to-date plants, particularly when it is realized that a fraction of a part per million of contaminating solids in the steam may deposit many pounds of solids in superheaters and turbines, owing to the high capacity of the steam generating units and the necessity for long continued service without shutdowns of boilers and turbine equipment.

Many different forms of steam purifier have been designed, which could not possibly be described in detail here. Generally speaking, these purifiers fall into two groups. One group removes solids by changes in the direction of steam flow, while the other washes the steam by contact with the boiler feed water.

In the first class is a purifier in which the entering steam passes through rows of vertical gutter-shaped baffles which are placed in a staggered arrangement. In this design the steam is split up into small "ribbons," so that a large surface is exposed to the scrubbing action of the baffles. The steam passes through into a central compartment and discharges through the steam nozzle, while the particles which have impinged on the gutters are drained into a collecting trough at the bottom. They may then be discharged to the feed water supply or to waste through a suitable trap.

In another type of steam separator the steam enters an external annular section tangentially, through radial blades which impart to it a vigorous whirling motion. Centrifugal force drives the moisture and solids towards the periphery to a separating zone of maximum concentration, and they fall to the bottom of the purifier. An upper collecting race is provided for particles which rise higher. The water may be returned to the boiler drum or discharged outside through a trap.

A third design of dry purifier forces the steam to expand into the separator drum and experience a reduction in velocity which causes part of the suspended matter to drop out. The velocity is increased as the steam passes through a central nozzle, which directs it against a baffle. Moisture is collected by impinging on the baffle and by the change in the direction of the flow, and the dry steam passes through an outlet beyond the baffle. The water may be drained back to the boiler drum if the steam contamination is not caused by excessively high concentrations, in which event the water is best discharged to waste through a trap.

The discharge of highly concentrated water in this manner automatically provides a supplementary blow-off under conditions of high ratings and increased carry-over.

In a centrifugal separator which has proved successful the wet steam enters through directing vanes which are placed around the periphery of the main separating chamber. Large droplets are broken up in passing through the vanes and the steam is directed against the wall of the chamber and is thus given a rotary motion. Centrifugal force removes a large part of moisture, which drains down the wall into the bottom of the compartment. After impinging on the bottom of the bowl, the steam is directed upward through the chamber and thence out of the nozzle through the steam outlet. Moisture depositing on the wall of the upper chamber forms a thin film and is unloaded by an ejective effect at the lower edge of the wall. The moisture which is collected in the annular ring is discharged through a tangential take-off to the boiler water or to a steam trap outside the boiler.

The turbo steam purifier employs a combination of centrifugal and jet action of the steam, and also the principle of inertia for removing the heavier particles. The steam flows at high velocity through an inlet nozzle, and then, by means of a deflecting plate, the steam flows towards the outside in a conical stream. Water and other impurities glide along the deflecting plate and from there into a channel. As the weight of the deposited particles increases, the bulk is pushed over the edge of the deflecting plate into a receiver. The steam continues its passage and is finally discharged.

A number of steam purifiers provide intimate contact between the steam and the boiler feed water, either by bubbling, spraying or jet action through so-called "contact tubes." It is the purpose of this step in the process to absorb, in the feed water, droplets of boiler water which are entrained in the steam. The moisture in the steam may, of course, be relatively high after this process, but instead of the highly concentrated boiler water, it will be much more dilute feed water. The wet steam is then dried, as much as possible by screens or various separating devices.

In one popular type of washer, the incoming feed water is discharged in horizontal sprays, forming a sheet through which the steam must pass to reach the outlet tubes. The impact of the vertical sprays replaces boiler water with droplets of feed water and the wet steam rises through the scrubber elements leading to the outlet tubes. These scrubber elements are corrugated plates, bolted together with spacers between them in such a manner that the corrugations of adjoining sections overlap slightly and cause the steam to take a tortuous path in passing through the channels. The large wetted area and the change of direction effect the separation of most of the residual moisture, which is returned to the feed water within the boiler room.

In another washer, the washing elements are a series of cast-iron trays with vertical sides, to which feed water is supplied by risers from the main feed water line. In the center of each tray, and between adjacent trays, a long

rectangular aperture, with vertical sides to retain the water, provides means of entry for the steam. Each of these rectangular openings is covered with a metal hood with sawtooth edges, and the angular openings in the hoods are submerged below the level of the feedwater. As the steam is released from the drum it passes upwards through the openings in the trays and bubbles out through the serrations in the hoods, thus exchanging the highly concentrated droplets of boiler water for moisture in the form of feedwater. After rising through the water the steam passes through a series of screens designed to remove most of the moisture, and thence is conveyed through the steam outlet nozzle or through tubes leading to the super-heater header.

A third type of steam washer works on the principle that the steam which is liberated in the front drum of the boiler enters the washer drum through two rows of tubes, and flows into a space which is separated from the rest of the drum by tight baffles. Feed water entering through a perforated pipe rises in the trough and overflows a serrated weir, maintaining a level about ¼ to ½ in. above the top row of holes in washer hoods. The height of the water may be varied by adjusting the weir. The feedwater which spills over the weir supplies the downcoming circulating tubes at the bottom of the drum, the water level being about 6 in. below the center of the drum. The steam from the space enters the series of hoods and passes through the perforations, bubbling through the water and entering the upper part of the drum. In this process the boiler water entrained in the steam is absorbed in the feed water. The wet steam passes through a sandwich of wire mesh and behind the baffle leading to the tubes, which are connected to the saturated steam header of the superheater. In passing through the wire mesh and the subsequent baffle section of the drum, the steam is freed of the greater part of the moisture acquired in the washing process. Steam washers of this type can be installed in one drum of the boiler or a separate drum can be provided when boiler circulation and construction do not lend themselves to this type of installation.

Fiber Identification—

(Continued from page 150)

creases easily, whether the fibers are continuous filament or staple, whether the yarn has much or little twist, whether there is any signs of more than one kind of fiber present. Listen to the material when rubbed between the fingers and smell the material. According to experience, sometimes one, sometimes several, but sometimes none of these simple indications gives a sufficient clue for identification, but they require so little time and are always worthwhile.

The next more objective test should be the burning test. The burning test shows the broad classification, while in some cases it is capable of showing quite fine distinctions. For example, the manner of melting in acetylated cotton is a useful guide to the degree of acetylation. The more easily it melts the higher is the degree of acetylation. In weighted silk, the more difficult it is to char, the less it shrinks on burning and the more robust the ash skeleton the more heavily was the silk weighted.

The behavior of the fibers as they are approached to the flame should be noted, also the odor from the fibers while burning or while smouldering, noting if the fibers will smoulder. The form and color of the bead, if any, is noted, and finally an attempt should be made to extinguish the fibers by nipping between finger and thumb while still burning. The melting of low acetylated cellulose and of mixtures of cellulose and cellulose acetate fibers can be detected in this way, since only fibers that melt stick to the skin.

If the fibers are uncolored the best next step is probably to apply a stain such as Shirlastain A. Note the color of the mass of fibers and then unless one is quite certain there is no possibility of a mixture, one should mount the stained fibers on a glass slide and examine them under a microscope. Under these conditions one can see very easily from their individual colors and general appearances whether there is a mixture present and useful indications of the kinds of fibers present. If the fibers are colored as received try a microscopical examination without staining them first.

The third test to try is to cut a section by the plate method. The whole of the operation only takes two or three minutes to perform. Apart from a microscope all that is needed is a length of fine sewing cotton, safety razor blade in a holder and a small silicon carbide stone to sharpen it on, a bottle of medium made up of India ink, glycerine and gelatine of such consistency that it will set on cooling and melt on heating, a cover glass and a metal plate 3 in. by 1 in. by 20 thousandths of an inch, drilled with a hole 30 thousandths inch diameter.

The cotton thread is looped and the doubled end pushed through the hole in the plate. A suitable bundle of fibers is put through the loop and pulled by the cotton into the hole in the plate. The projecting fibers on each side of the plate are sliced off with the razor and the plate covered with a cover glass and examined by the microscope. The black medium is useful when examining animal or vegetable fibers. A small amount is melted on a glass rod and smeared on to the fibers before pulling into the plate and allowed to cool and set before cutting as before.

The cross sections seen are useful in many ways. Seeing a large number of fibers at once gives a true impression of the typical cross-section of the sample. The presence and proportions of different kinds of fibers can be noted. Finally many fibers show their most characteristic appearance in cross section. Little need be said about appearance of different fibers because nothing will replace the observation of authentic specimens for yourselves, though good photographs are helpful.

When you have made these preliminary tests there should be no difficulty in saying what fibers are present.

For further examination it is now the time to apply such tests as are set out in Table B of the Textile Institute's Scheme (J.T.I. 32, No. 6, June, 1941) (see "T.M. Year Book," 1939, p. 470). If animal fibers are detected a

reference should be made to "Animal Fibers of Industrial Importance" (W.I.R.A.), Wildman. In dealing with vegetable fibers Matthew's "Textile Fibers" is not to be scorned merely because it is so old. If no microscope is available it will be best to follow the Table A of Textile Institute's scheme. No one procedure can be suitable to all circumstances.

Note: Skinkle's "Textile Testing" might well have been added to this list.—Ed.

• OPEN FORUM •

Rules under which this department of the REPORTER is conducted are as follows:

1. Anyone who has a technical problem on which he would like advice may submit it to the Reporter and it will be published in the first available issue.

2. Any reader who feels that he has a solution of the problem may forward his reply to us and if we feel that the reply is suitable it will be published in a succeeding issue.

3. For each such reply published the Reporter will pay a minimum of $2.

4. In case there is more than one answer to the same question, the one covering the subject in the most complete and authentic manner will be published, or if two answers are sufficiently different both will be published. If two answers are considered equally good, the one first received will be given priority.

5. The Reporter will assume no responsibility whatsoever for the accuracy of the answers submitted—it is simply offering a vehicle for the public expression of its readers' opinions.

6. Both the questioner and answerer must send in his complete name and address. When requested we will publish only the initials or other identifying insignia.

56—While text book information is available regarding the process of chlorinating wool, it has been found that this is somewhat contradictory and does not always work out satisfactorily in practice. We should be pleased to have a definite procedure for chlorinating wool fabrics both in the form of woven cloth and knit goods that has been satisfactorily used; also, the type of apparatus which is best suited for the purpose.—**R. O. B.**

Answer: Scoured goods were worked ½ hour in a cold bath containing 10 lbs. hydrochloric acid.

After allowing to drain, the goods were laid upon the reel and carried to a second cask and worked cold for ½ hour in a bath of chlorinated lime ¾° Tw. The lime (bleaching powder) should contain about 35 per cent active chlorine.

Meanwhile the first cask was drained and a bath of 8 lbs. sulfuric acid 66° made up. The goods were worked for ½ hour cold, rinsed well and dried for printing.

Chlorinating leaves a yellowish tint which can be removed by stoving.

The machinery used for production was a 16 line dye kettle with studded reel. The goods were worked as above but all operations were performed in one kettle.—**K. H.**

• CLASSIFIED • ADVERTISEMENTS

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $6.25 per column inch or less per insertion.

POSITION WANTED: Hosiery dyer for past sixteen years on pure silk, cotton, rayon, nylon and mixed fibers, with large hosiery mill in south as head dyer. Capable of handling large production, willing to go anywhere, best reference. Member of American Association of Textile Chemists and Colorists. Write Box No. 355, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

POSITION WANTED: PLANT MANAGER: Experienced plant and production manager in the dyeing, printing and finishing field seeks new connection with progressive organization as plant manager or superintendent of production. Will consider position as contact man between the New York market and the mill on production troubles and adjustments. At present employed. Write Box No. 363, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

WANTED: Research chemist for work on chemical specialties used in textile and allied trades. Practical textile experience desirable. Give experience, education and references. Write Box No. 366, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

POSITION WANTED: Research chemist, textile dyeing and finishing, experienced in compounding specialties in the textile and allied trades, seeks connection with progressive organization. Write Box No. 371, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

POSITION WANTED: Fireproofing of canvas is the particular field of interest of research chemist, desiring southern location. College education, knowledge of formulation, raw materials, test methods. Has also had training and experience in synthetic resins. Write Box No. 374, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

POSITION WANTED: Plant superintendent in charge of manufacturing textile chemicals and specialties, desires position with larger concern. Have formulas and practical knowledge for production. American. Married. Write Post Office Box No. 57, Somerset, Mass.

WANTED: Dyer—experienced vat, naphthol and sulfur colors on rayon and cotton yarns. Reply stating experience and salary expected. Box No. 376, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

Sulphur

IS NOT ALL THE SAME TO CALCO

● Calco's annual consumption of Sulphur tops thirty million pounds. None of it rates less than 99% real Sulphur. But for our purposes of dye and acid production, we have specifications for five distinct types. They range from bright to dark yellow in color. For certain needs, sizable vitreous lumps are most suitable. For others only a powder form of carefully controlled fineness meets Calco standards. Moisture, ash and solubility characteristics are checked to within narrow limits.

Taking such care with the simplest or commonest of raw materials has always been a fundamental safeguard of the quality of Calco dyestuffs, intermediates and other chemicals. Today's demands on all Industry make it even more important. Being sure every step is *right* saves time, lost motion all along the line and conserves natural resources.

CALCO CHEMICAL DIVISION
AMERICAN CYANAMID COMPANY
Bound Brook, New Jersey

Boston • Philadelphia • Providence • New York • Charlotte • Chicago

Calco Dyes Are Better Buys

Calco

RAPIDASE

THE PREFERRED DE-SIZING AGENT

for cottons, rayons and mixed goods

For your de-sizing problems— our technical men are at your service . . . Write or 'phone.

WALLERSTEIN COMPANY, INC.
180 MADISON AVENUE, NEW YORK

New York's
Friendliest Hotel

Where Your Comfort Comes First

Its perfect location in the heart of the centre of textile activities has long made the Prince George the favorite New York hotel of people in the textile wet processing business. Out of town textile men can do more in less time, when they make this hotel their headquarters.

You have your choice of 1,000 spacious rooms, all with bath. Five famous restaurants and a cafeteria. Quiet, yet within three minutes of the shopping district. When you bring your family with you, trained supervisors will entertain your children. New low rates make the Prince George New York's most outstanding hotel value. Write for booklet F.

Single room with bath from $2.50
Double room with bath from $3.50

Prince George Hotel

14 EAST 28th STREET GEORGE H. NEWTON *(Manager)*

Manufacturers of Dyestuffs and Chemical Specialties

We offer
Two new cationic type softeners

TEXAMINE

a pure white permanent softener economical to use due to its complete exhaustion qualities

TEXAMINE K

a permanent softener and desizing agent for processing grey goods in the kier eliminating the customary grey desizing.

May we serve you?

COMMONWEALTH COLOR & CHEMICAL CO.

MAIN OFFICE AND WORKS: Nevins, Butler and Baltic Streets, Brooklyn, N. Y.
Philadelphia • Chicago • Charlotte • Gloversville • Kansas City • Montreal

The Knit Goods Processing Number

of the

AMERICAN
DYESTUFF REPORTER

will appear on

APRIL 27, 1942

●

SPECIAL ARTICLES
OF INTEREST
TO ALL KNIT GOODS
WET PROCESSORS
WILL APPEAR

●

NO INCREASE
IN REGULAR
ADVERTISING RATES

●

ADVERTISING COPY
IS DUE APRIL 13

●

**AMERICAN
DYESTUFF REPORTER**
**440 FOURTH AVENUE
NEW YORK, N. Y.**

THE ALRO LINE

A Full Line of Textile Specialties

ALROSE Chemicals, backed by extensive research, are uniform in quality and high in efficiency. They are produced by trained chemists and practical men to satisfy the exacting needs of modern textile processing.

GLYCERINE SUBSTITUTES
Economical, effective.

CAT-ION SOFTENERS
A complete line—a type for every use.

WETTING AGENTS
Various types for various purposes.

SYNTHETIC DETERGENTS
For wetting, scouring, levelling, emulsifying. Acid-resistant, lime-resistant, unaffected by hard waters, economical as ordinary soap.

WATERPROOFING COMPOUNDS
One bath—good repellency.

PRINTING GUMS
Including a new special gum for acetates.

PRINTING PASTES
For sandbag and camouflage cloth.

Request further information or ask representative to call.

ALROSE
Chemical Company
PROVIDENCE, R. I. • TEL. Williams 3000
Devoted to Products of Research

INDEX TO ADVERTISERS

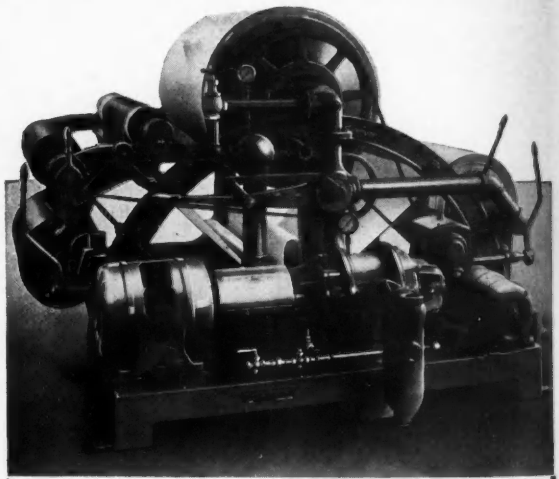
Alrose Chemical Co.	XVII
Amalgamated Chemical Corp.	
American Aniline Products, Inc.	III
American Cyanamid & Chemical Corp.	Back Cover
American Dyewood Co.	
Ansul Chemical Co.	
Aridye Corp.	VIII, IX
Arkansas Company	XIX
Arnold-Hoffman & Co., Inc.	
Atlas Electric Devices	
Becco Sales Corp.	
Bick & Co., Inc.	
Blickman, Inc., S.	
Burkart-Schier Chemical Co.	XVIII
Butterworth & Sons Co., H. W.	Second Cover
Calco Chemical Division, American Cyanamid Co.	XV
Campbell & Co., Inc., John	
Carbide & Carbon Chemicals Corp	
Carbic Color & Chemical Co.	XII
Ciba Company, Inc.	
Colgate-Palmolive-Peet Co.	
Commonwealth Color & Chemical Co.	XVI
Du Pont de Nemours & Co., E. I.	X, XI
Dyestuffs Division	Front Cover
Fine Chemicals Division	
R. & H. Chemicals Dept.	
Emery Industries, Inc.	
Exact Weight Scale Co.	
Fancourt & Co., W. F.	
Franklin Process Co.	
Gardinol Corp.	
Geigy Company, Inc.	
General Chemical Co.	
General Dyestuff Corp.	V
Hart Products Corp.	
Hercules Powder Co.	
Naval Stores Department	
Synthetics Department	
Hotel Manger	
Hooker Electrochemical Co.	
Houghton & Co., E. F.	
Kali Manufacturing Co.	
Kelco Co.	VI
Laurel Soap Mfg. Co.	
Mathieson Alkali Works	
National Aniline Division, Allied Chemical & Dye Corp.	XIV
National Carbon Co., Inc., Carbon Sales Division	
National Oil Products Co.	
Nyanza Color & Chemical Co.	
Onyx Oil & Chemical Co., Inc.	VII
Perkins & Son, B. F.	
Philadelphia Quartz Co.	
Prince George Hotel	XVI
Procter & Gamble	
Riggs & Lombard, Inc.	
Rodney Hunt Machine Co.	
Rohm & Haas Co.	XX
Royce Chemical Co.	
Sandoz Chemical Works	
Scholler Bros., Inc.	Third Cover
Socony-Vacuum Oil Co., Inc.	
Solvay Sales Corp.	
Stein, Hall & Co., Inc.	
Union Carbide & Carbon Chemicals Co	
Van Vlaanderen Machine Co.	XVIII
Virginia Smelting Co.	
Wallerstein Co., Inc.	XVI
Warner Chemical Co.	
Warwick Chemical Co.	
Wolf & Co., Jacqes	
Young Aniline Works	
Zinsser & Co.	

Hosiery and Underwear manufacturers will find Burk-Schier wet processing agents efficient and economical for scouring . . . degumming . . . bleaching . . . dyeing . . . softening . . . finishing.

BURKART-SCHIER CHEMICAL CO.

BURK-SCHIER CHATTANOOGA, TENNESSEE BURK-SCHIER

PENETRANTS • SOFTENERS • SOLUBLE OILS • FINISHES



IF YOU PROCESS **SPUN RAYON**

investigate the advantages of

DECATING Gives spun rayon an added sales appeal both to the hand and to the eye—at a fraction of a cent per yard. The machine shown has the largest production of any manufactured.

Write for full data

VAN VLAANDEREN

MACHINE COMPANY

370 STRAIGHT STREET, PATERSON, N. J.

..with Culofix

REG. U.S. PAT. OFF

With priorities . . shortages . . substitutes and the growing scarcity of high grade colors bringing many other problems, there's no need to put up with bleeding in water of direct color dyeings. Whether the trouble occurs while the fabric is batched up after dyeing; in the finishing bath; or any other place where fastness to water is necessary . . *the cure is Culofix*

Used as an after treatment, Culofix prevents such color bleeding in all rayons, cottons and mixtures . . either cloth or hosiery. It is especially valuable for preserving crisp detail and contrast in prints. Ask us how you can try it.

Arkansas Co., Inc.

NEWARK, NEW JERSEY

Manufacturers of Industrial Chemicals for over 35 Years

Why is a yarn ~~weak~~ *strong*?

SCOTT INCLINED PLANE
SINGLE STRAND

YARN TESTER–

THIS machine is designed to measure the tensile strength and the elastic and plastic properties of individual filaments and yarns. The yarn to be evaluated is attached to the rolling weight, and as the plane on which the rolling weight rests is inclined, the tension on the yarn is gradually increased until the breaking point is reached. The friction between the rolling weight and the surface of the plane is reduced to a minimum and an extremely accurate measurement of the tensile strength of fine yarns is obtained. Tension and elasticity data are automatically recorded on a graph, thus giving a permanent record of the sample.

THREE WORDS ARE OUR WATCH-WORDS! *Precision, accuracy, and results* —these are the goals of the Rohm & Haas Textile Evaluation Laboratories in testing and analyzing the cloths and fabrics submitted to us by a textile industry just rolling up its sleeves to meet the increasing demand of a wartime economy.

In these modern, completely-equipped laboratories our technicians, skilled in the handling of fabrics of all kinds, operate delicate testing machines; each machine is specially designed to test precisely and accurately *one* property of a fabric or yarn. Our laboratories are equipped to evaluate and test almost any property which may conceivably be desired in a fabric, whether it be wet strength of a light, tough rayon parachute cloth, crush resistance of the softest velvet, or tensile strength of a single cotton thread.

For a scientific treatment of your particular textile problem, the precision and versatility of the Rohm & Haas Textile Evaluation Laboratories are at your service for the duration.

★ **LYKOPON**
★ **FORMOPON**
★ **PROTOLIN**
★ **RHONITES**
★ **RHOPLEXES**
★ **DEGOMMAS**
★ **TRITONS**
★ **RHOTEXES**

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA, PA.

Manufacturers of Leather and Textile Specialties and Finishes . . Enzymes . . Crystal-Clear Acrylic Plastics . . Synthetic Insecticides . . Fungicides . . and other Industrial Chemicals

"BEST LOOKING COUPLE . . ."

Indeed, they are! Take any fibre, or any mixture of fibres—combine with DuraBeau Finishes—and the fabric gains lavish beauty in perfect harmony with both the needs of the fibre and the demands of the market.

And, where the vital question is "How will it wear?" —DuraBeau assures wear-ability that withstands most critical appraisal.

This is extra value that SELLS! Use it in selling. By transfers, labels, inserts on packages, in all sales promotion, it pays to *say* the product is . . .

Reg. U. S. A. and Canada

DuraBeau
FINISHED
for lasting beauty, added wear

SCHOLLER BROS., INC • Mfrs. of Textile Soaps, Softeners, Oils, Finishes • Collins and Westmoreland Sts., Phila., Pa. • St. Catharines, Ontario, Canada

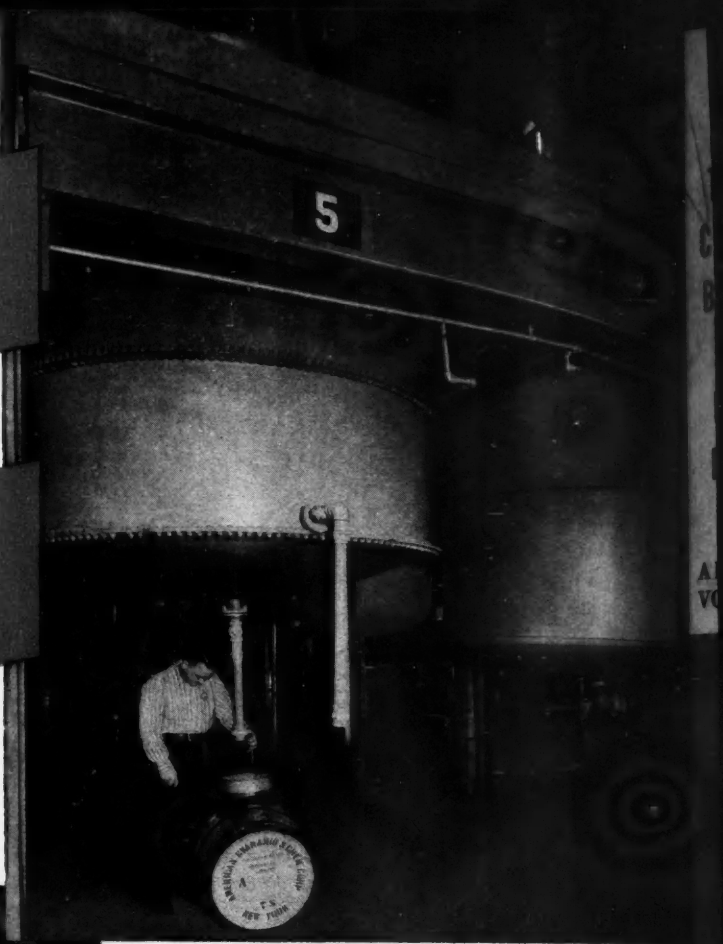
The practical advantages of

LARGE-SCALE PRODUCTION

to users of

CYANAMID QUALITY CHEMICALS

in the textile industry



(above) One of Cyanamid's modern large-capacity units for the production of textile chemicals. Large-scale production means greatest possible uniformity in chemical supply.

(left) A similar unit in another Cyanamid plant. Each step in Cyanamid's volume production methods is planned and carried out to deliver highest quality as well.

REGARDLESS of whether the volume required is moderate or in carload lots, chemicals for the textile manufacturing processes should be of a consistently reliable, uniform quality at all times.

The source of supply of textile chemicals... the sulphonated oils, penetrants, sizing compounds, wetting agents and other specialties . . . therefore becomes a primary consideration to the manufacturer in establishing economically dependable processing results.

Cyanamid recognizes this vital part played by chemicals throughout the textile industry. Cyanamid is also aware that the supplies required by the textile industry can best be provided by high-standard volume production, insuring the barrel by barrel uniformity made possible by large batch manufacture. As a result, Cyanamid has set up modern large-scale facilities adjacent to the important centers of textile manufacture.

Cyanamid today is able to assure textile manufacturers that their requirements, both large and small, will be accurately and quickly filled with chemicals of a consistently high quality.

Cyanamid is also prepared to serve textile manufacturers on problems relating to the proper selection of chemicals to meet changing specifications in production... a valuable extra service without charge or obligation that is backed by extensive research and practical field experience.

SULPHONATED OILS; PENETRANTS; SOFTENERS; FINISHES; SIZING COMPOUNDS; DECERESOL® WETTING AGENTS

AMERICAN CYANAMID & CHEMICAL CORPORATION

A UNIT OF AMERICAN CYANAMID COMPANY
30 ROCKEFELLER PLAZA · NEW YORK, N. Y.

DISTRICT OFFICES: 89 Broad Street, Boston, Mass.; 401 N. Broad Street, Philadelphia, Pa.; Bynum & Bayard Streets, Baltimore, Md.; 3333 Wilkinson Boulevard, Charlotte, N. C.; 850 Leader Building, Cleveland, Ohio; 20 N. Wacker Drive, Chicago, Ill.; Miller Road, Kalamazoo, Mich.; 931 Fisher Building, Detroit, Mich.; 900 Shell Building, St. Louis, Mo.; Azusa, Calif.